Oct. 21 AIRS Meeting - AIRS Moisture Validation

Larry McMillin, Jiang Zhao, James Yoe, M. K. Rama Varma Raja, Seth Gutman

Climate Research and Applications Division

National Environmental Satellite, Data, and Information Service

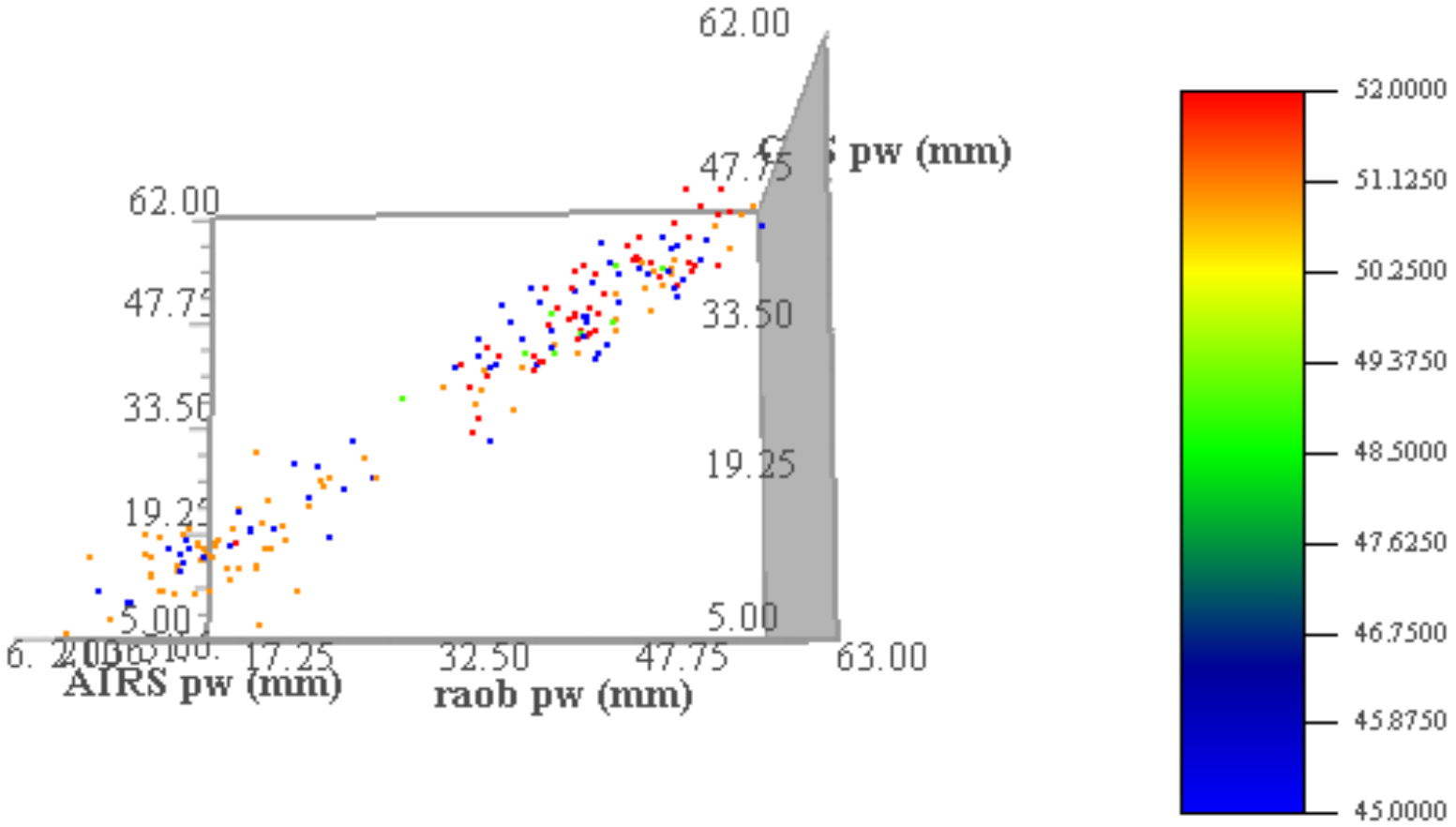
Washington, D.C.

Larry.McMillin@noaa.gov

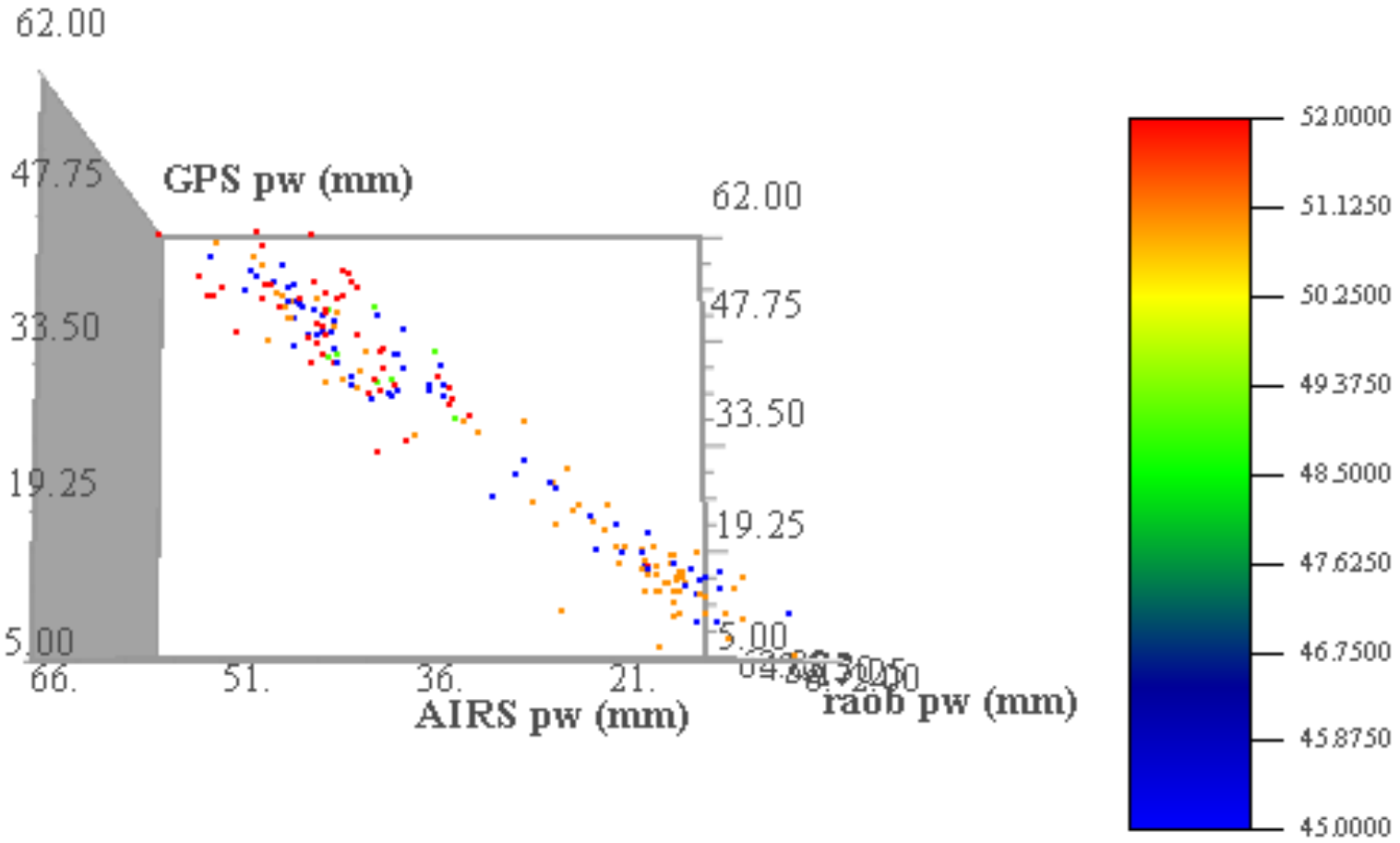
3 Way Moisture Comparisons

- The following show 3-way comparisons of total precipitable water
  - Radiosondes
  - AIRS
  - GPS
- The radiosondes that have close by GPS sites have been selected and matched with the GPS and AIRS data
- The color shows the radiosonde types

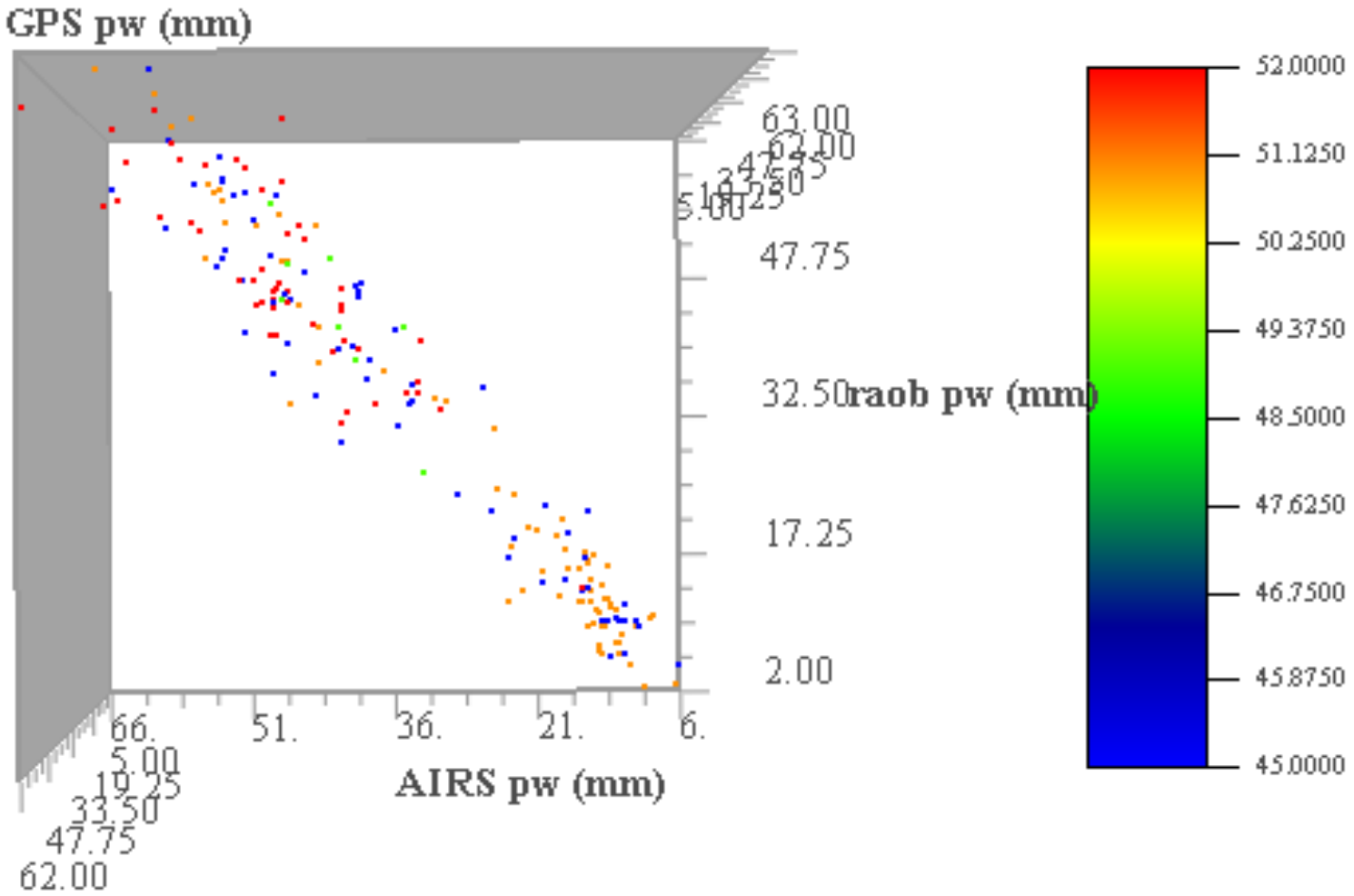
RAOB versus GPS



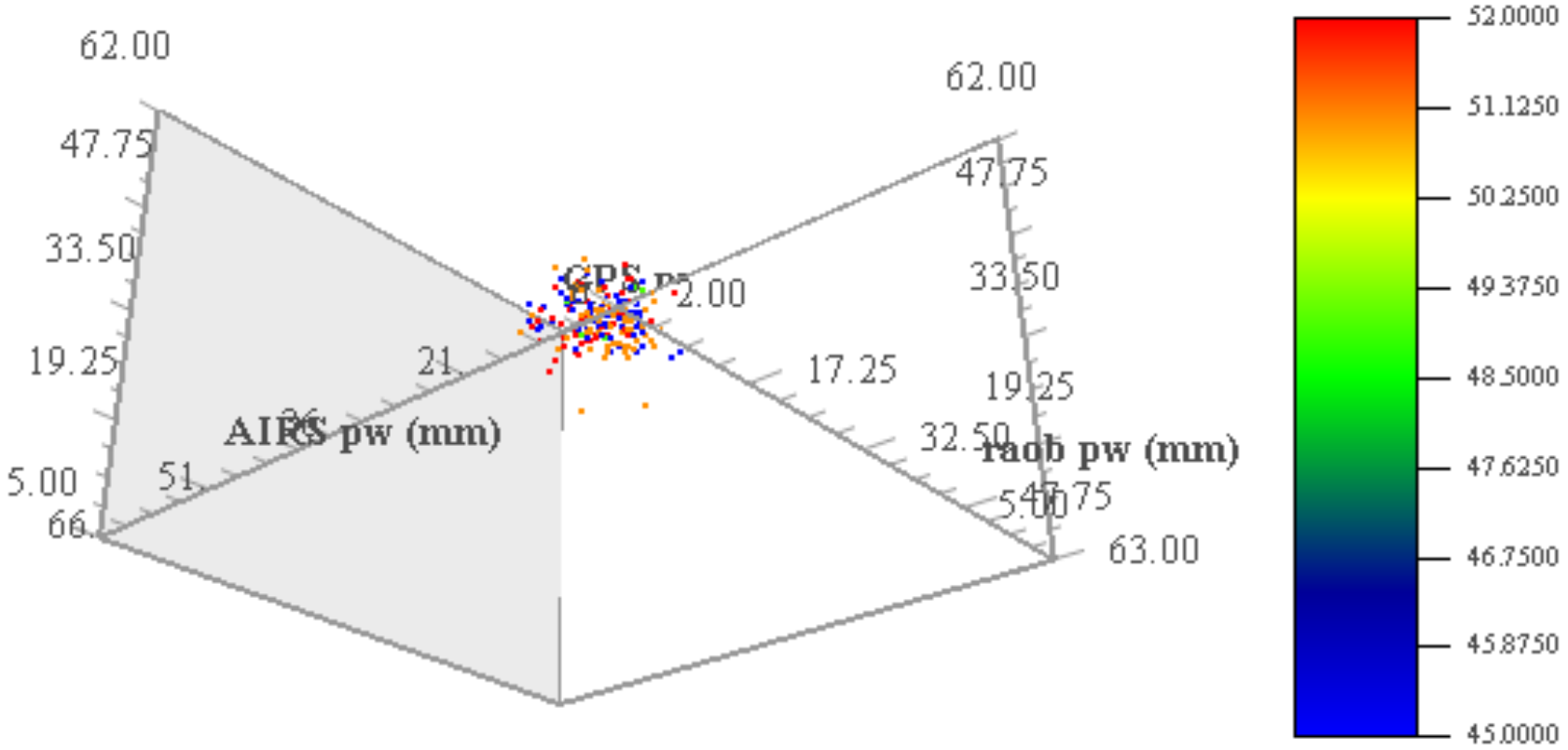
AIRS versus GPS



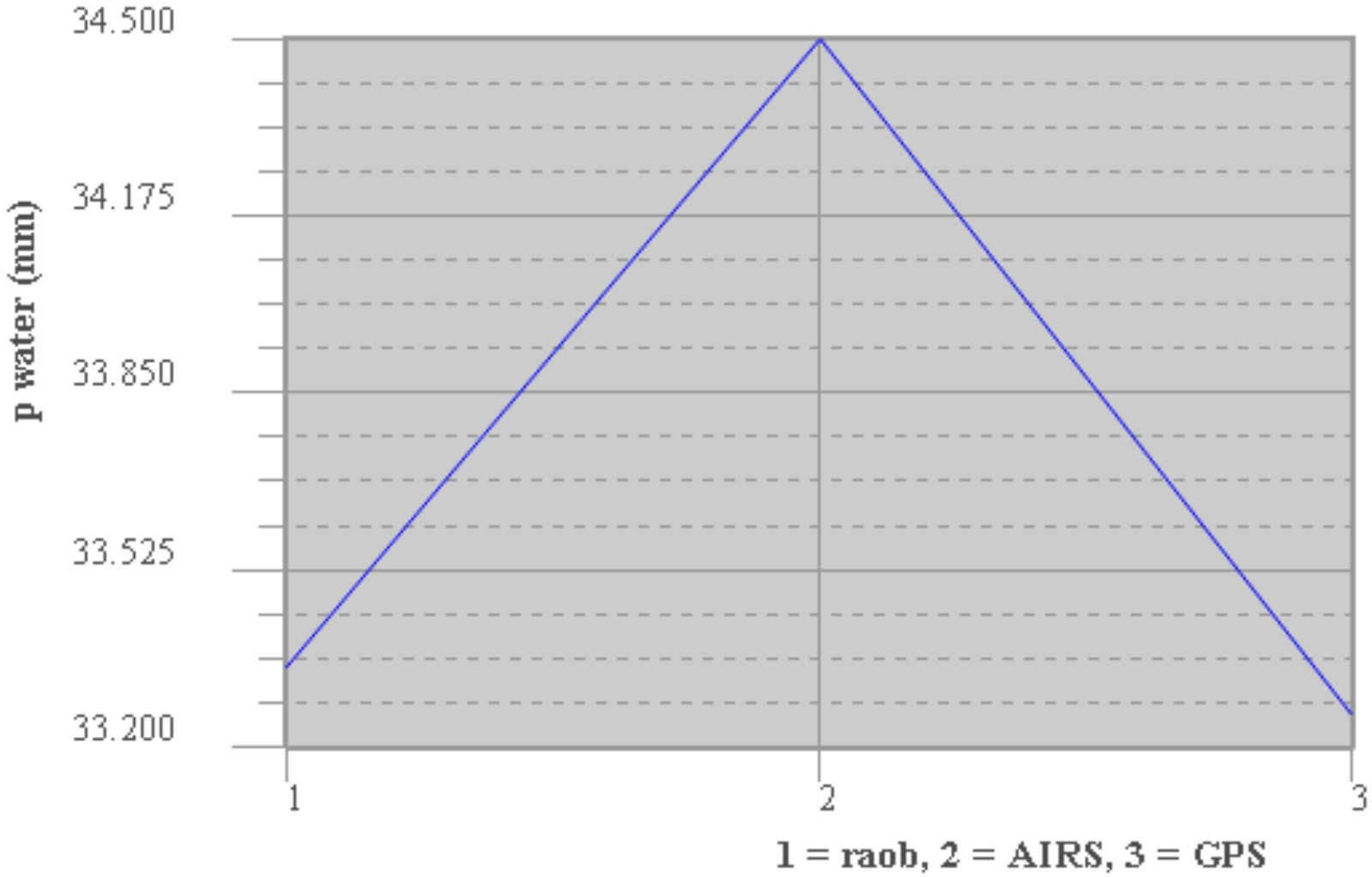
AIRS versus raob



Comparisons looking along the major direction. The largest scatter is in the AIRS – raob direction



Average Precipitable Water (mm)



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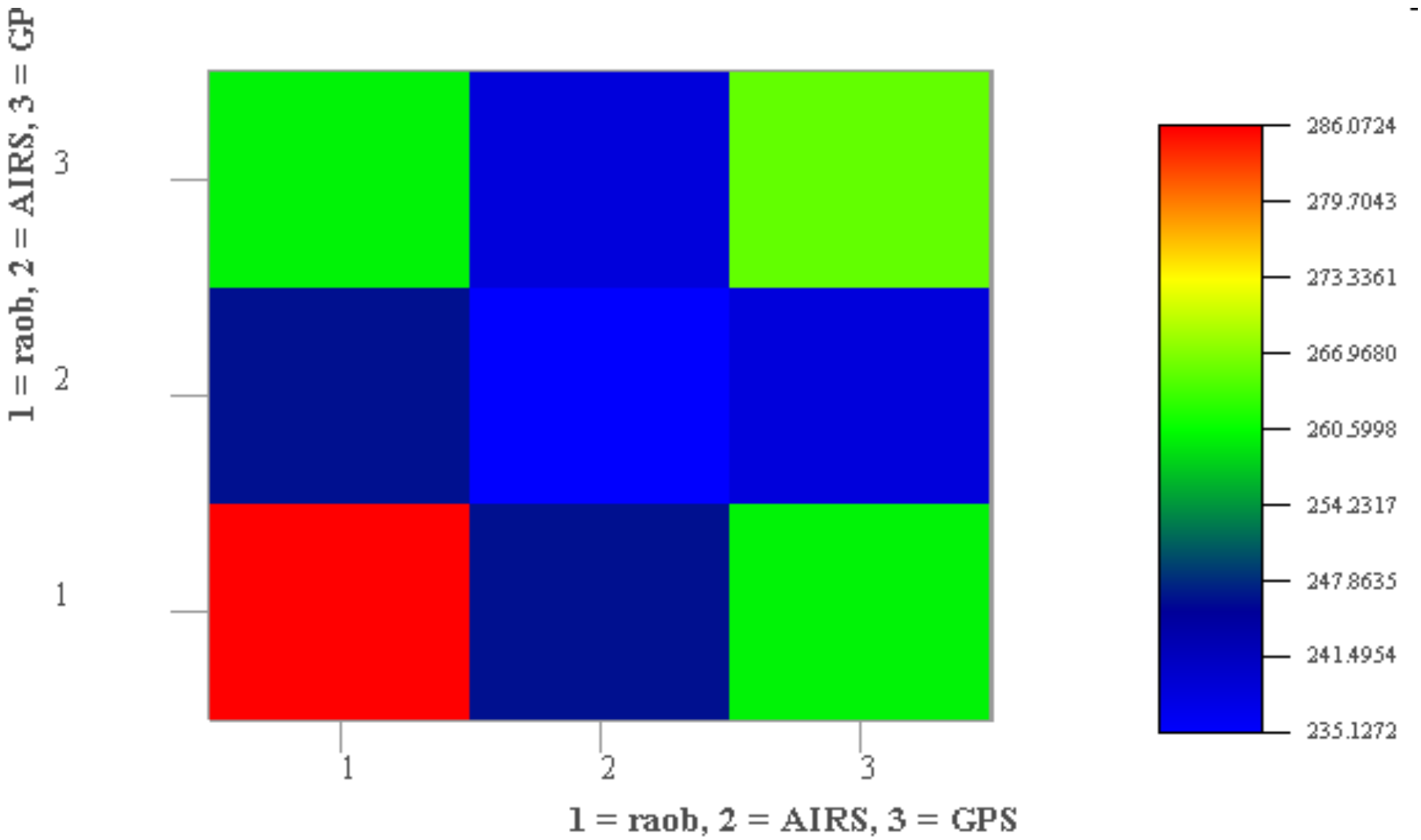
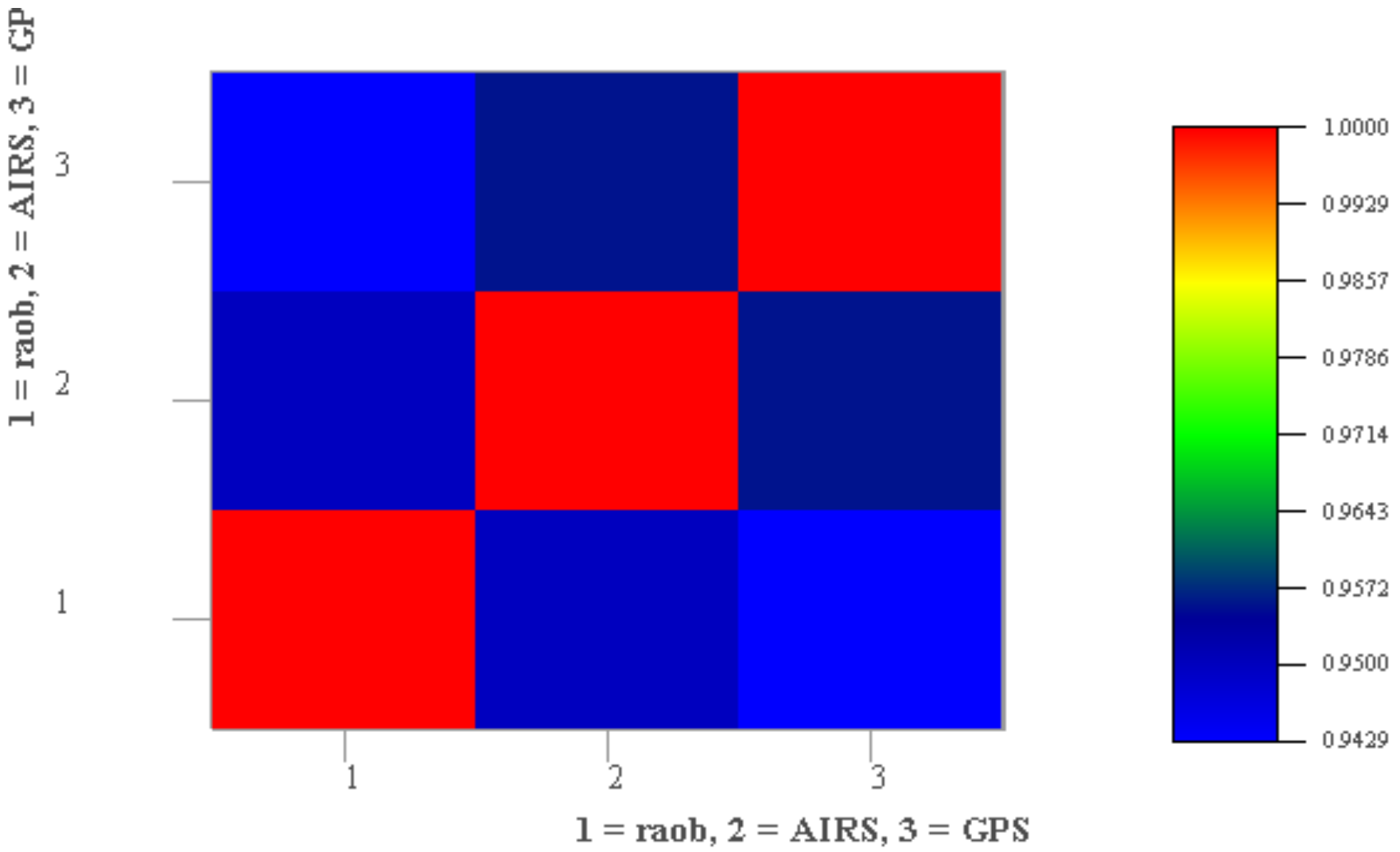
Covariances (mm^2)



Correlations - AIRS/GPS is slightly higher than AIRS/ raob, GPS/raob is lowest

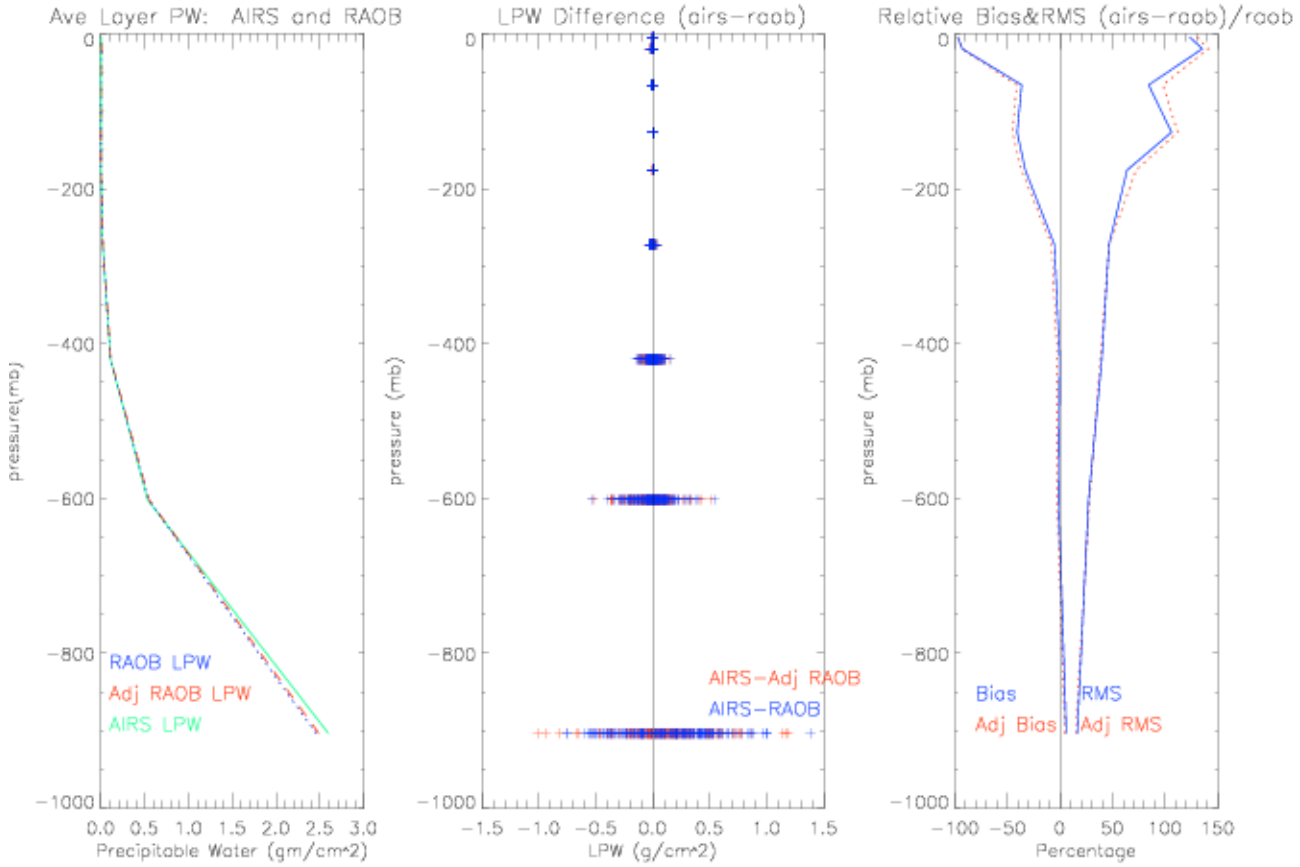


Eigenvector direction

- Direction of the major eigenvector
  - Raob 0.995545
  - AIRS 1.000000
  - GPS 0.997518
- Again AIRS is slightly better fit to GPS

Conclusions

- AIRS agrees well with radiosondes and GPS
- AIRS has a slightly better fit with GPS
- Both GPS and radiosondes show a larger total range of values than AIRS
  - Note AIRS retrievals are limited to clear areas so there could a natural bias
  - Even cloud cleared values represent the areas between clouds in partly cloud regions
- AIRS seems to be slightly biased high with respect to the others
- Next step is to use the GPS values to adjust the radiosondes and examine the vertical profiles
- Initial results how improvement at lower levels and degradation at upper levels - raobs can have a dry bias at upper levels and two dry biases (raob and AIRS) can agree without being right ?



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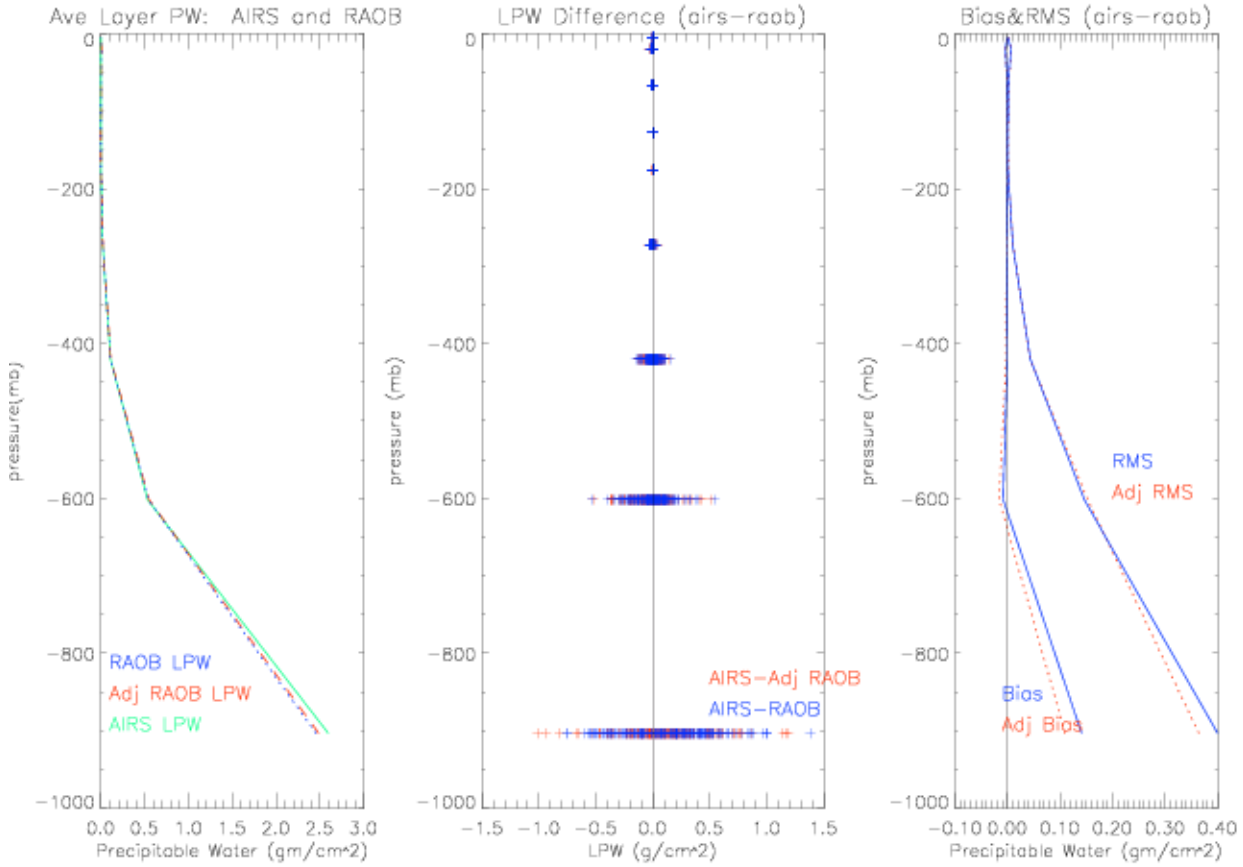

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Layer Precipitable Water

AIRS V3.0.8 with QAFlag=0 RAOB Type 61

Viasalla RS-80 expected dry bias

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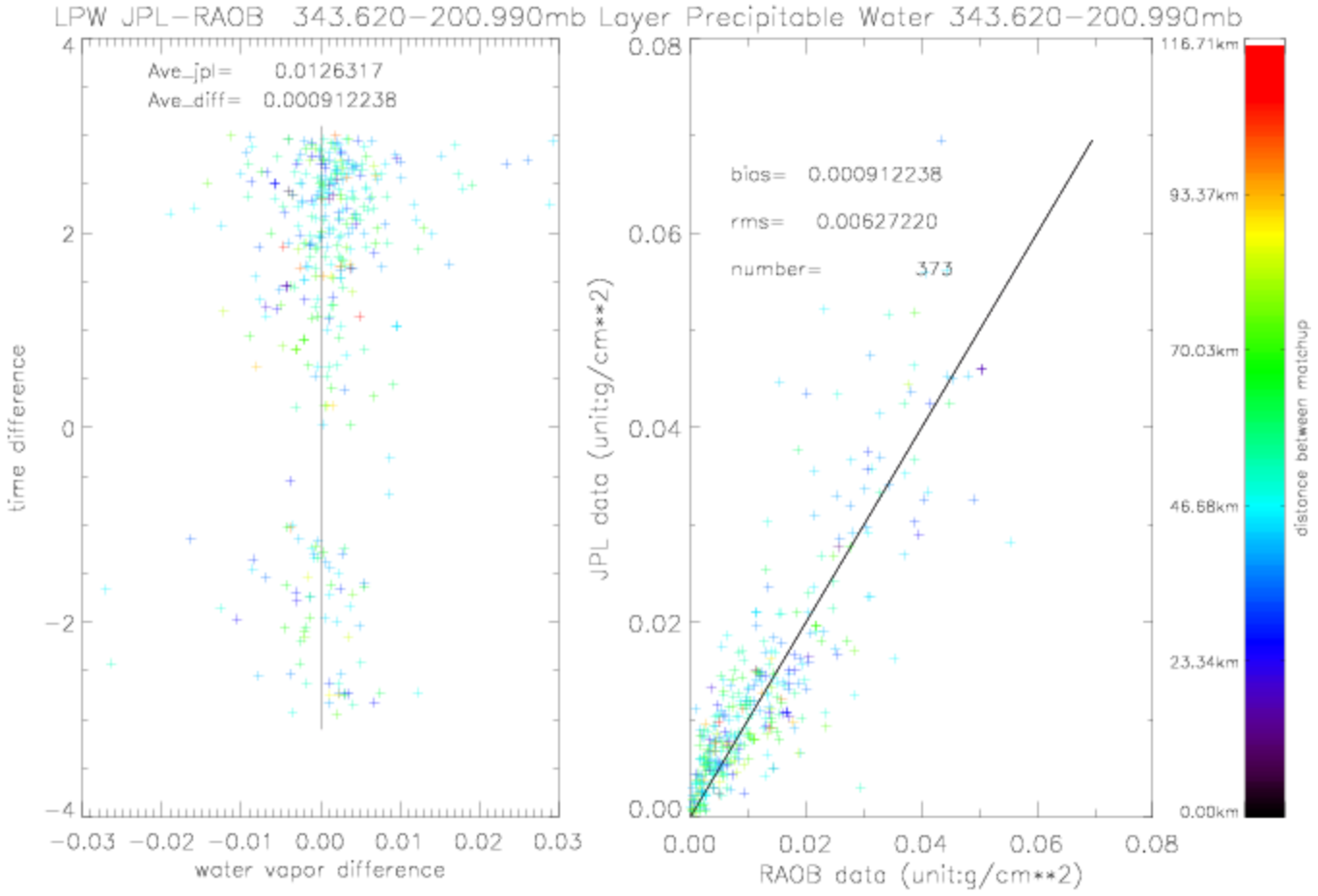

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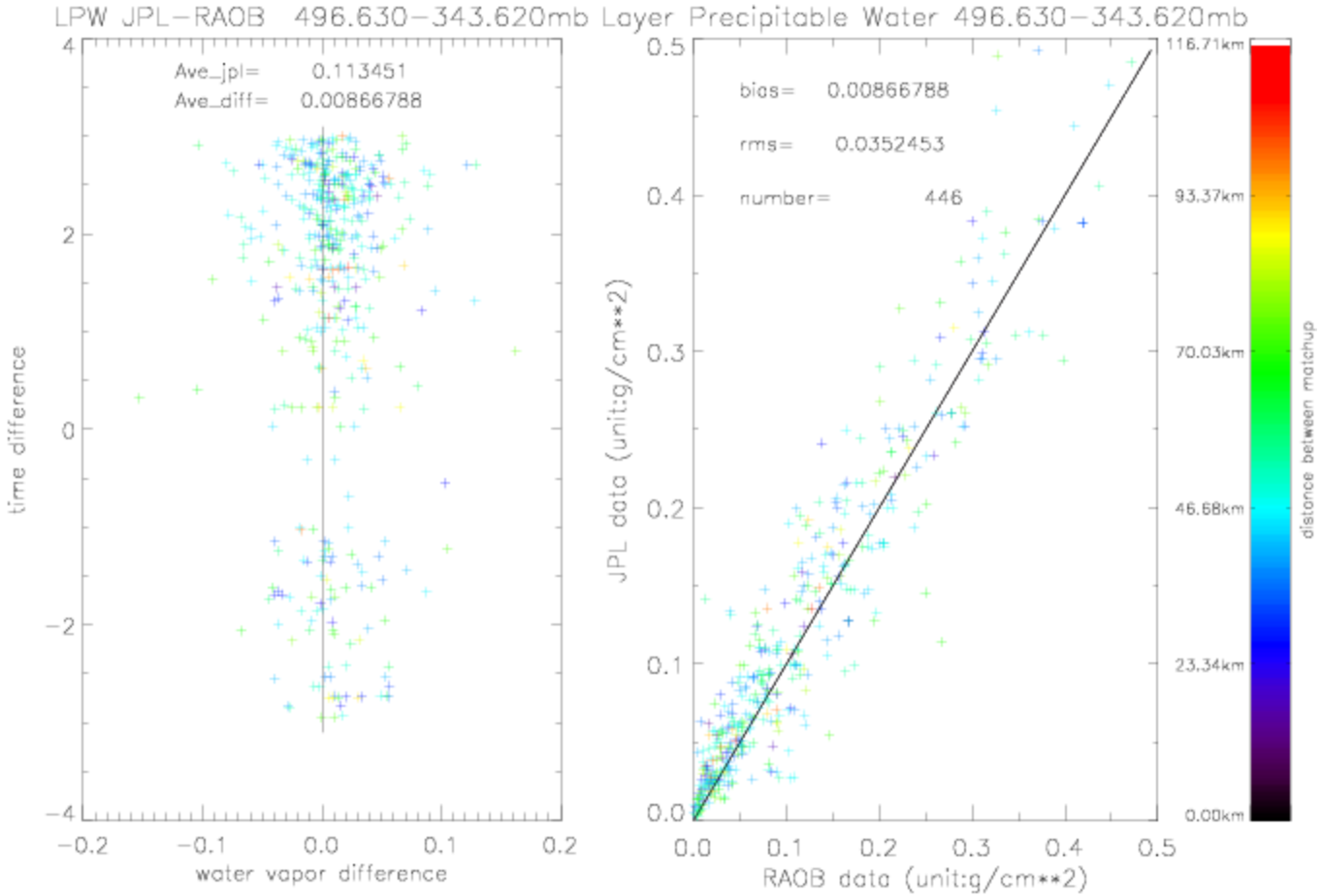

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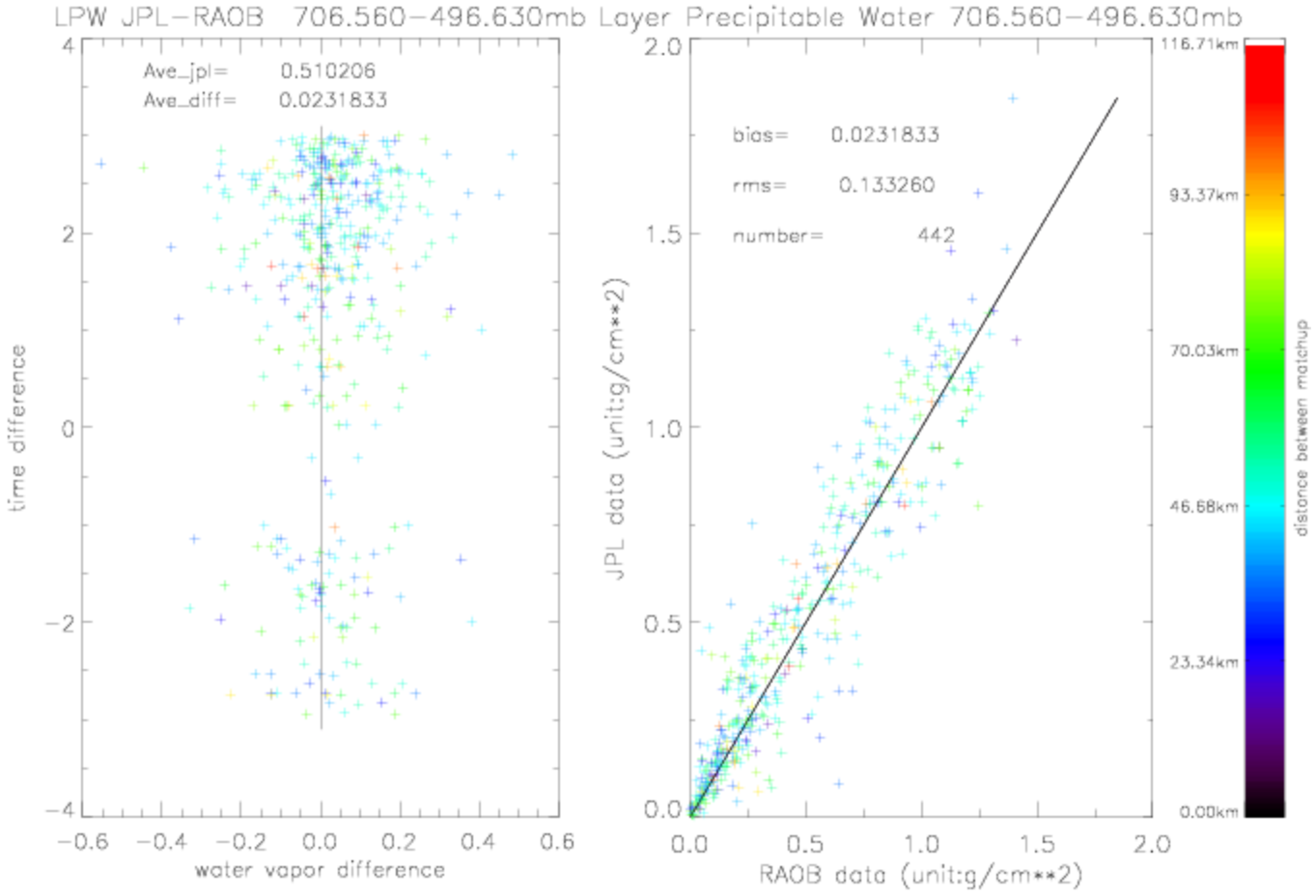

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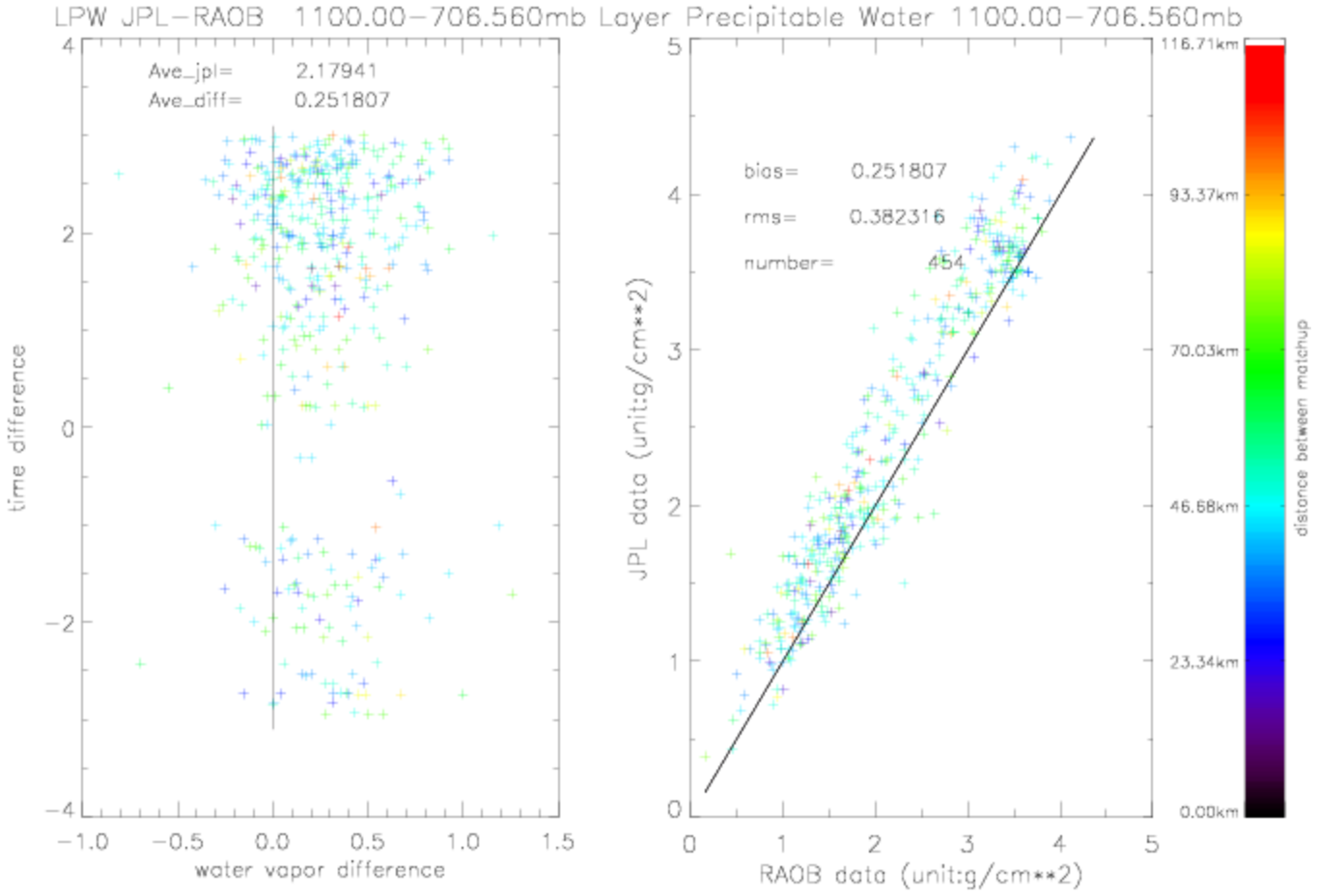

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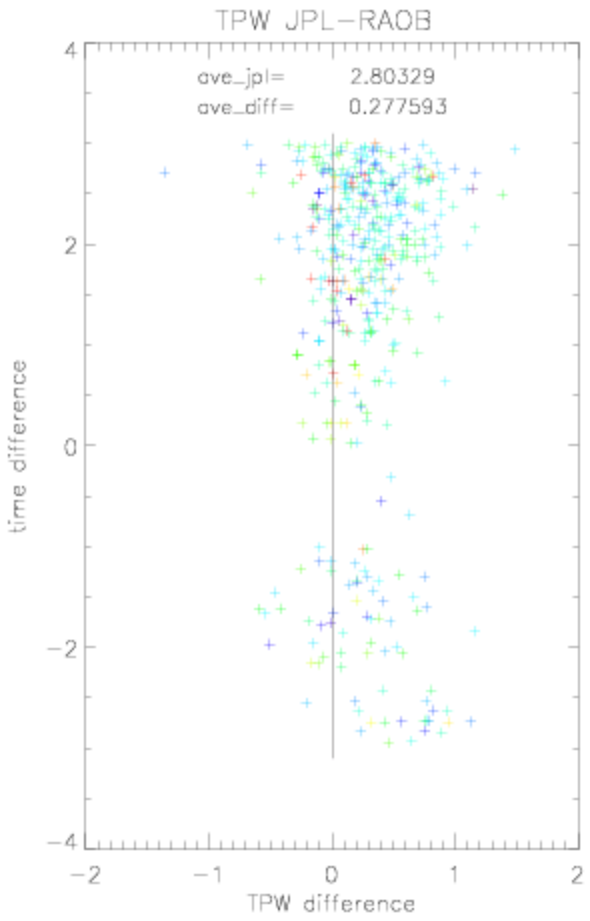

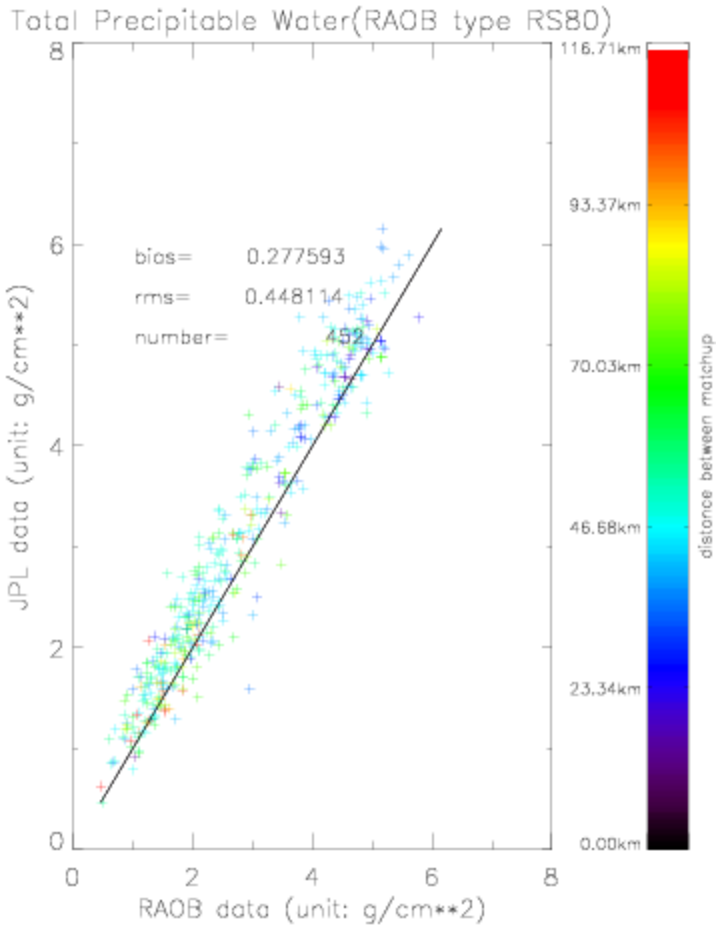

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Layer Precipitable Water

AIRS V3.0.8 with QAFlag=0 RAOB Type 71

Viasalla RS 90 smaller bias

Upper levels are probably not reliable

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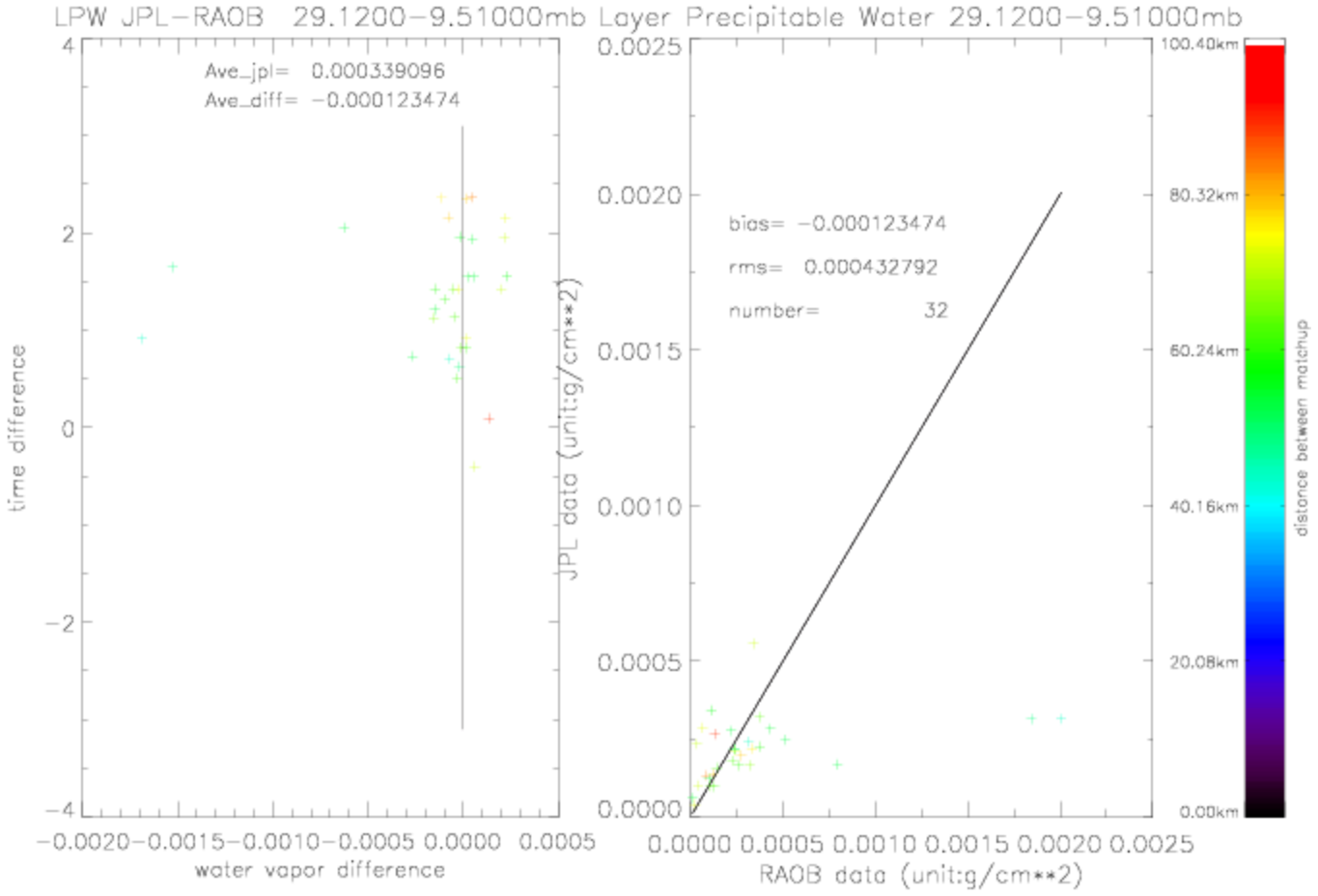

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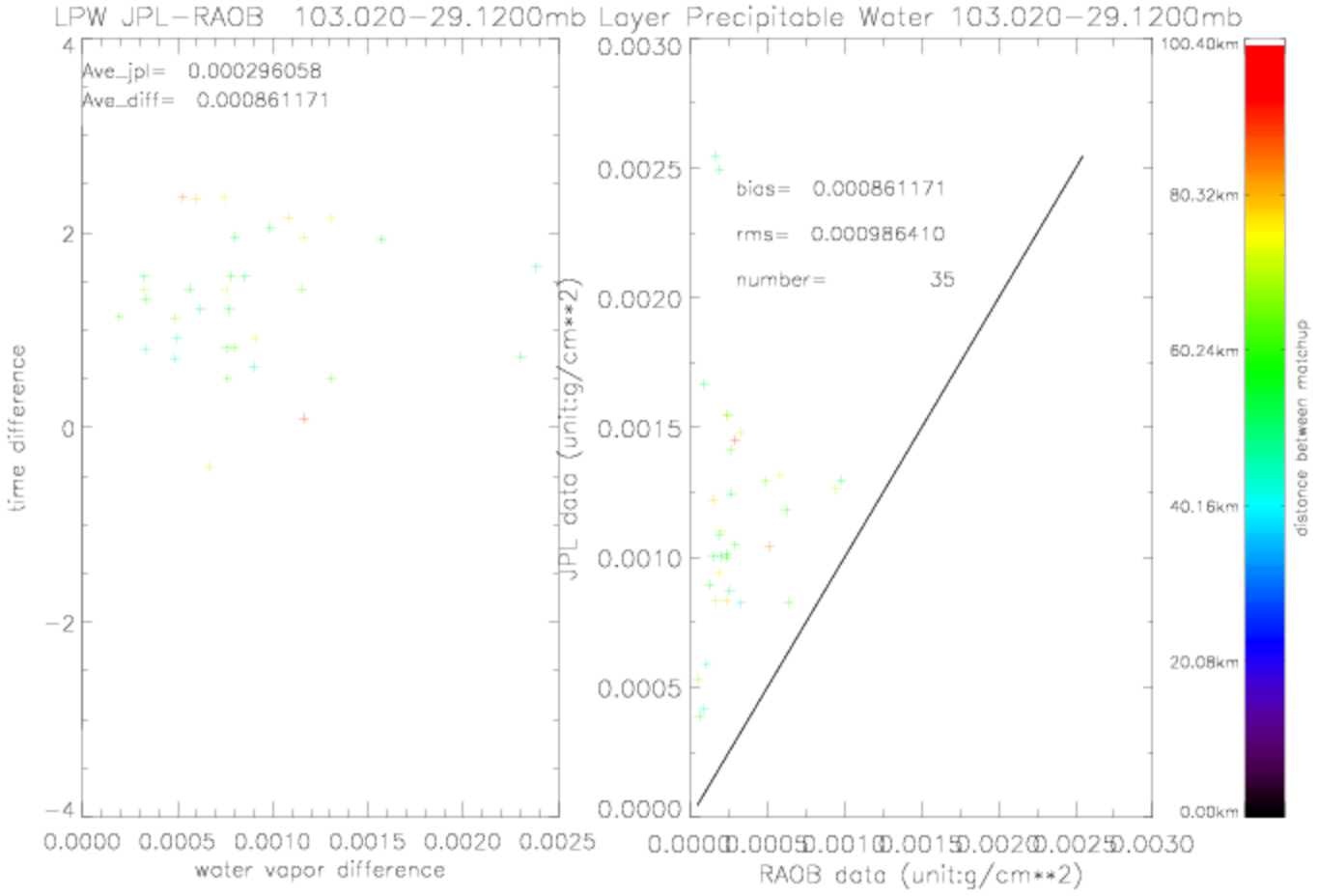

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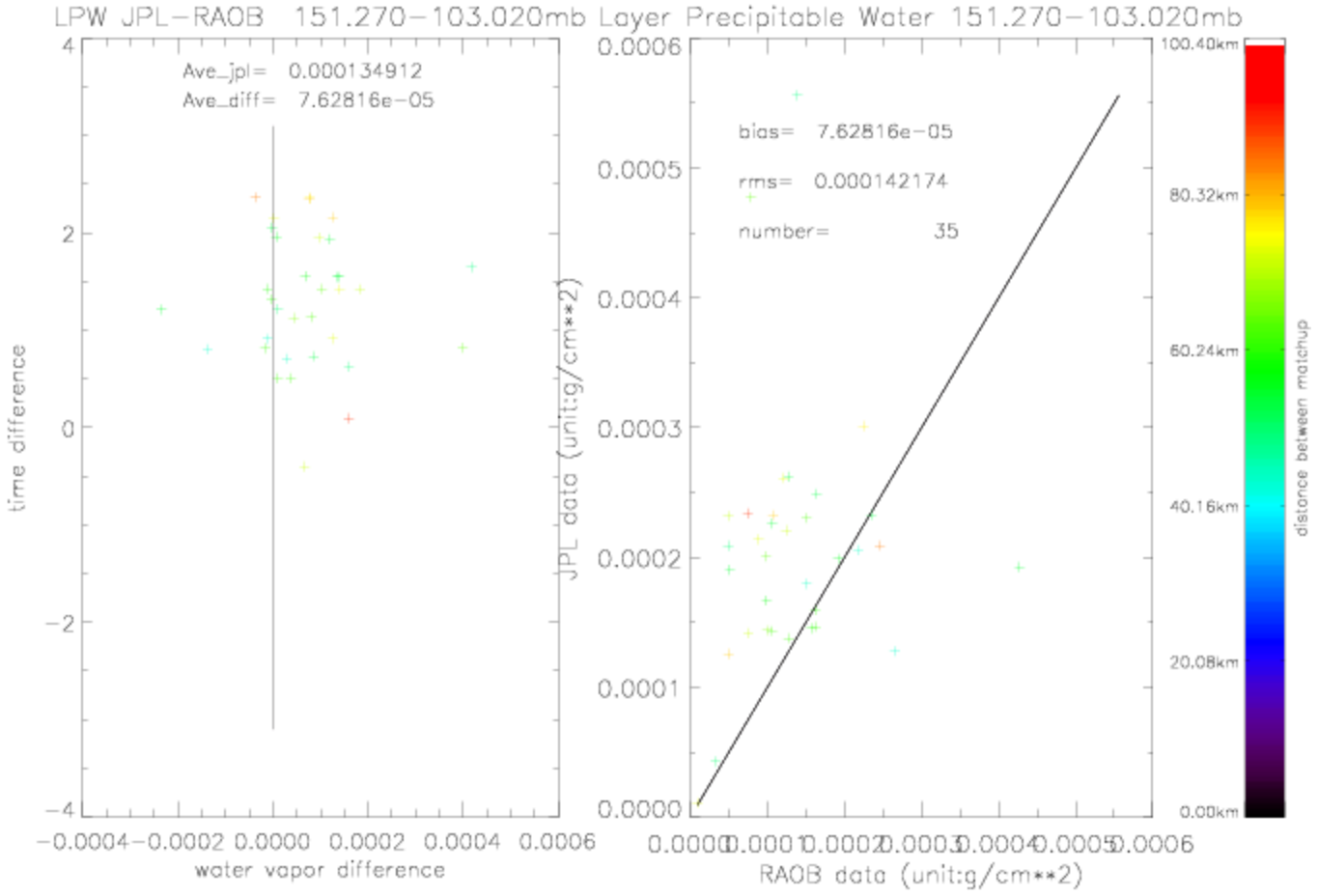

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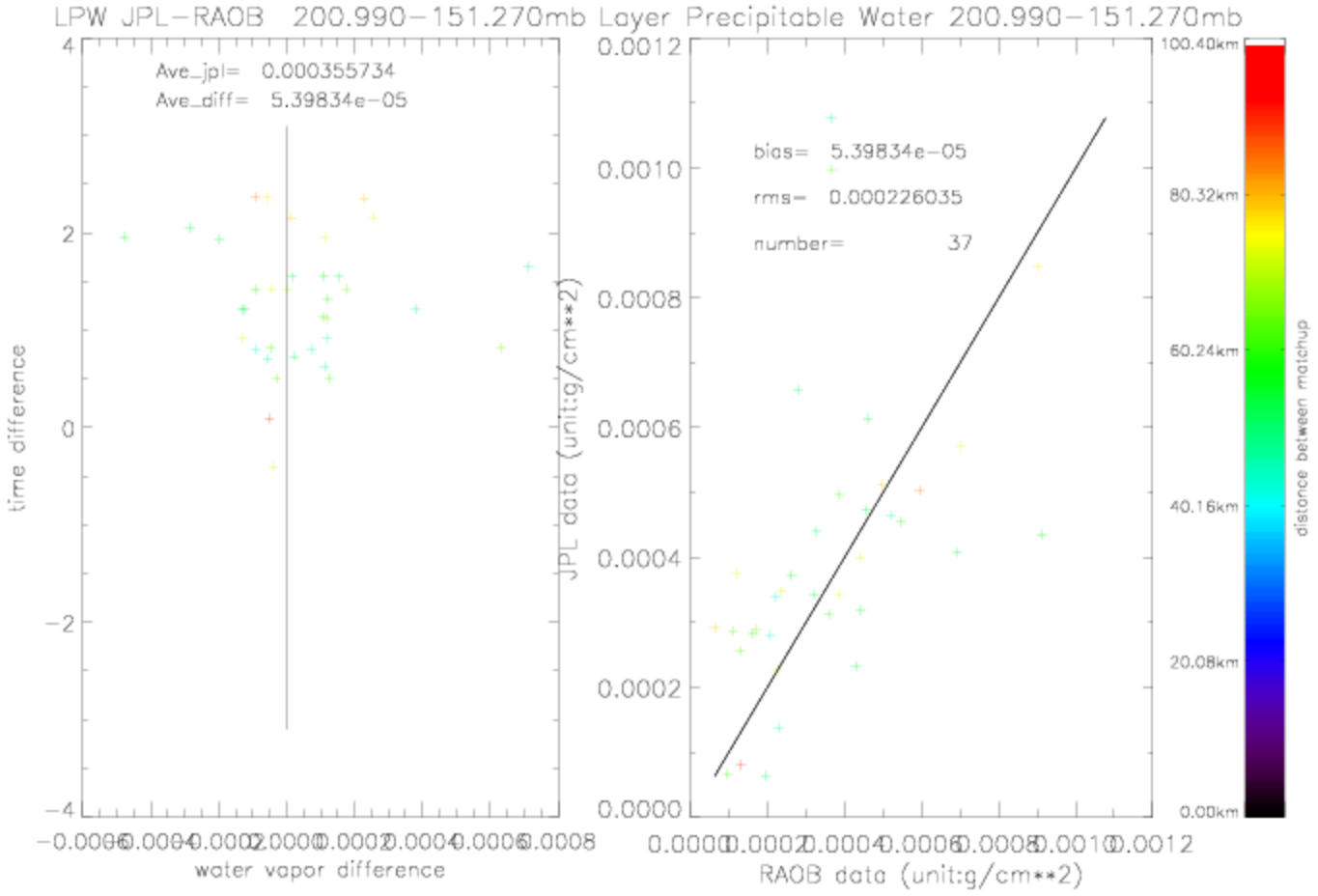

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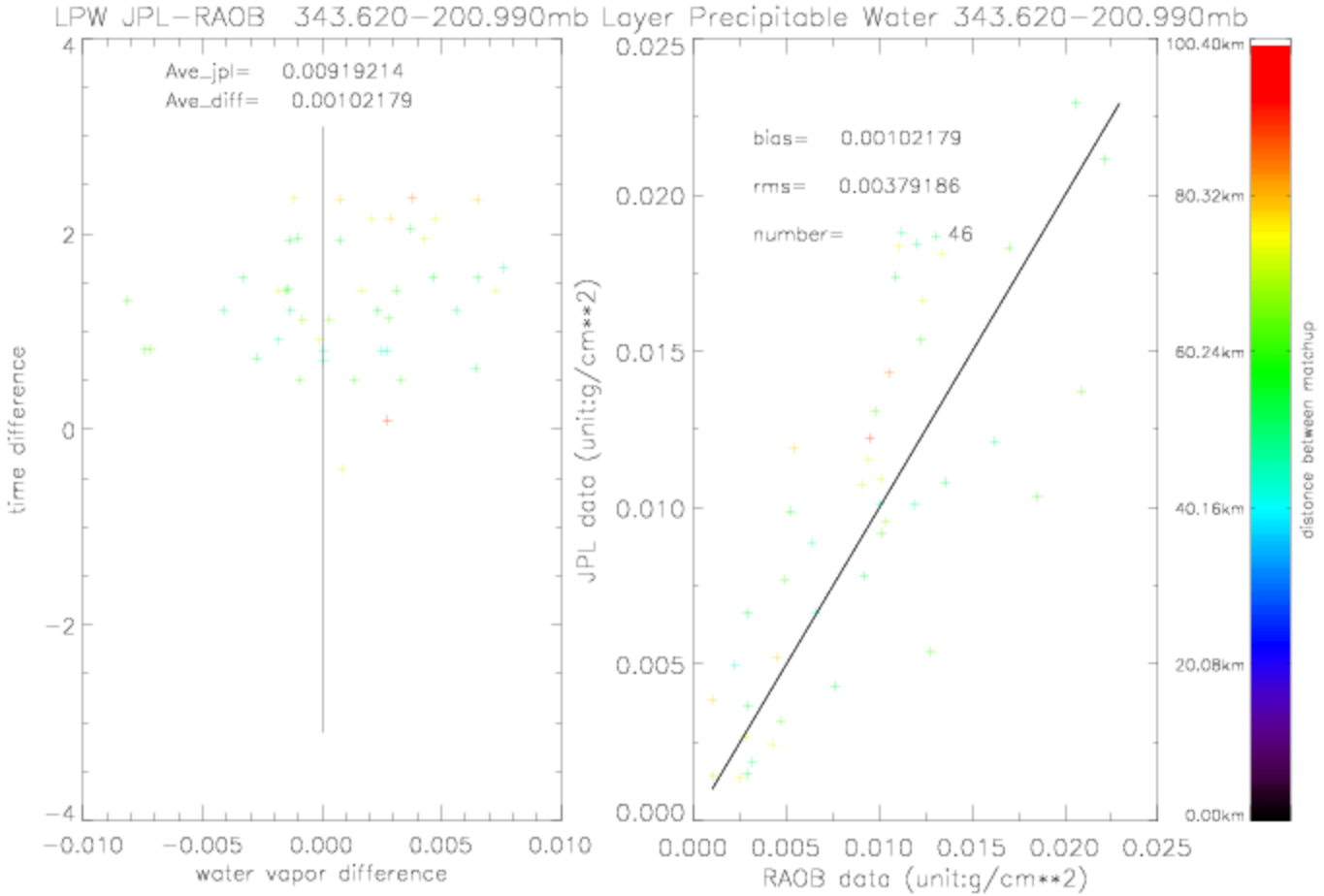

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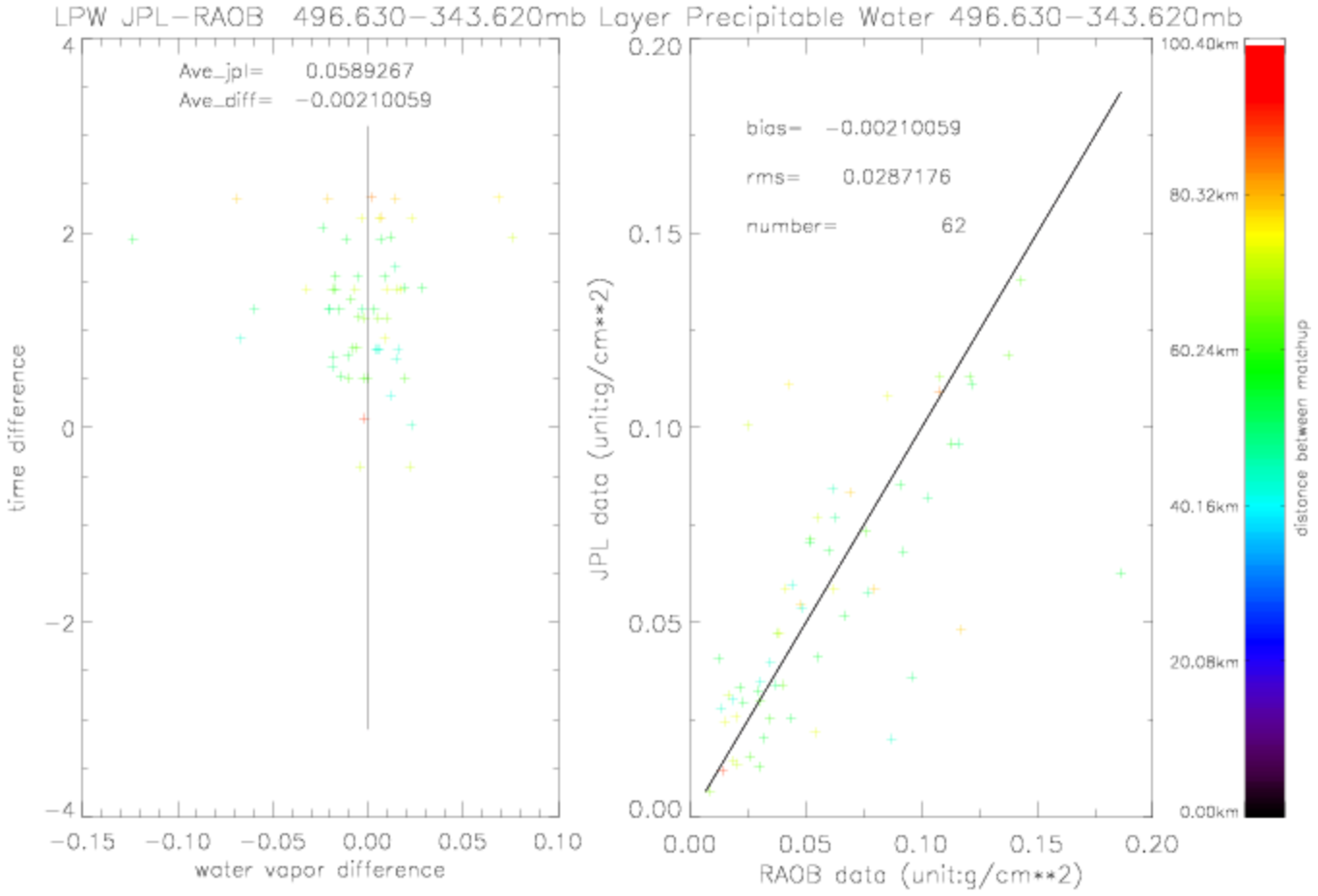

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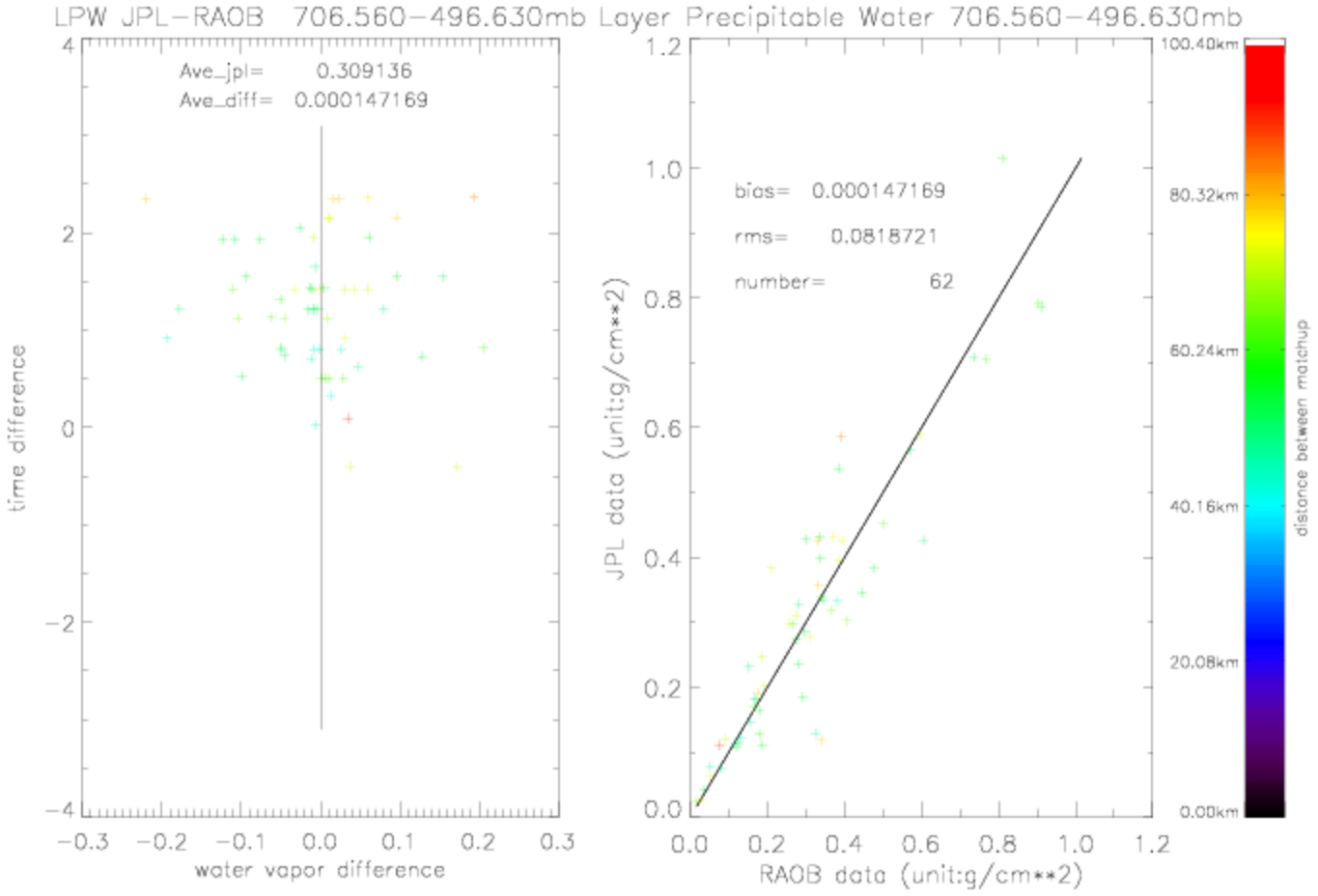

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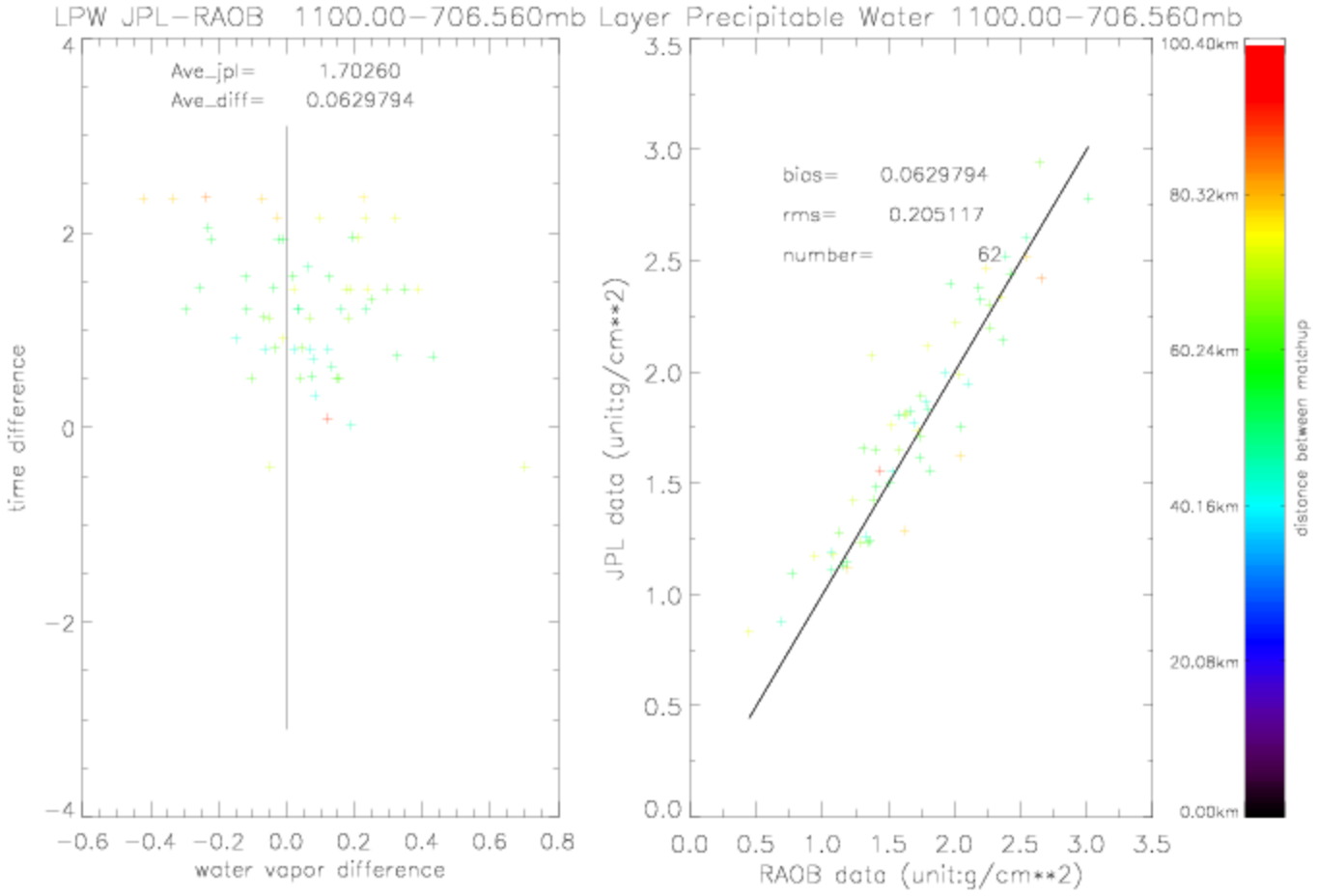

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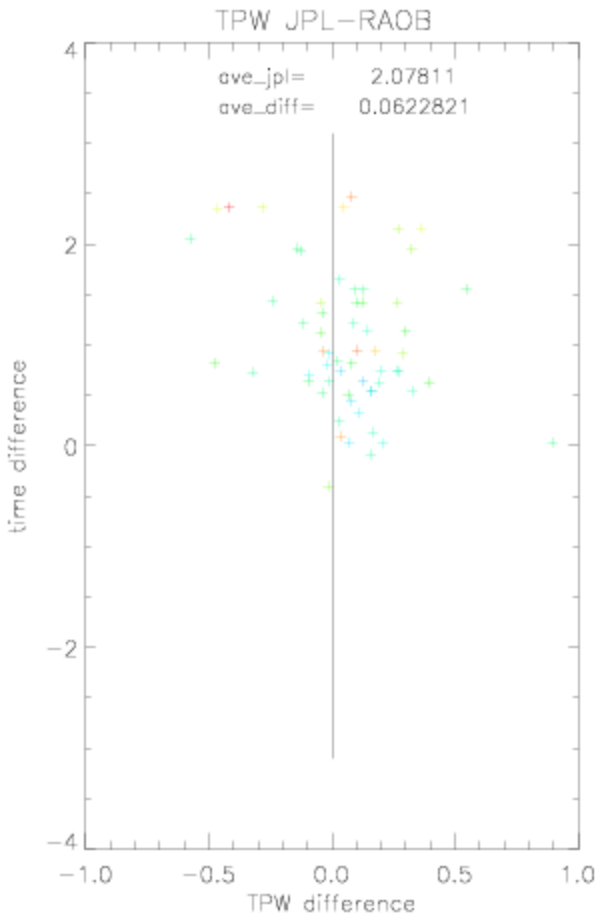

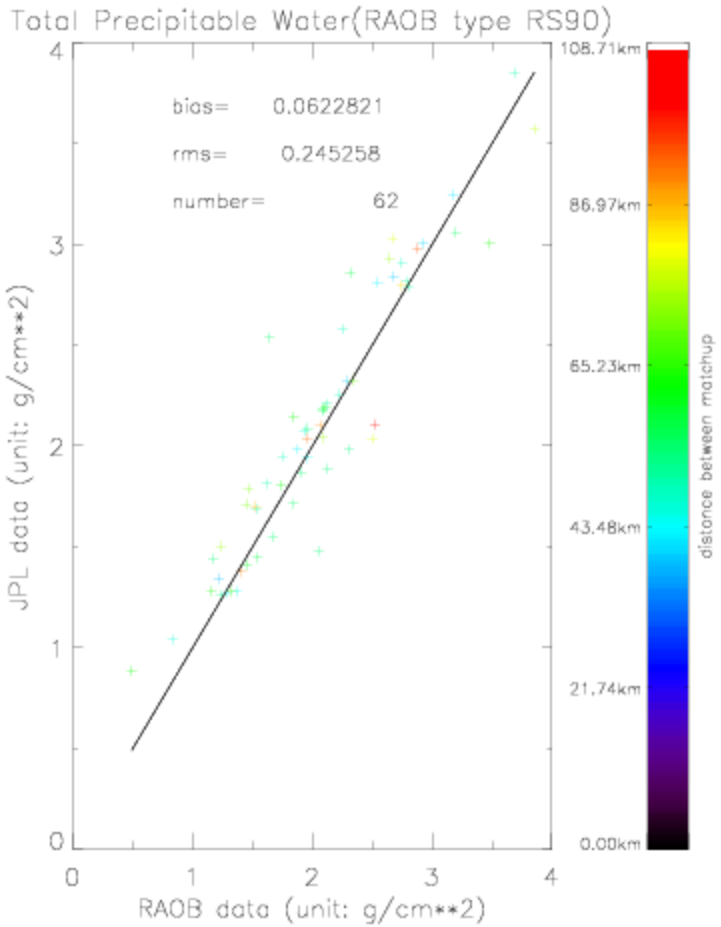

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Layer Average Temperature

Airs v3.0.8 , QAFlag=0

All RAOB types

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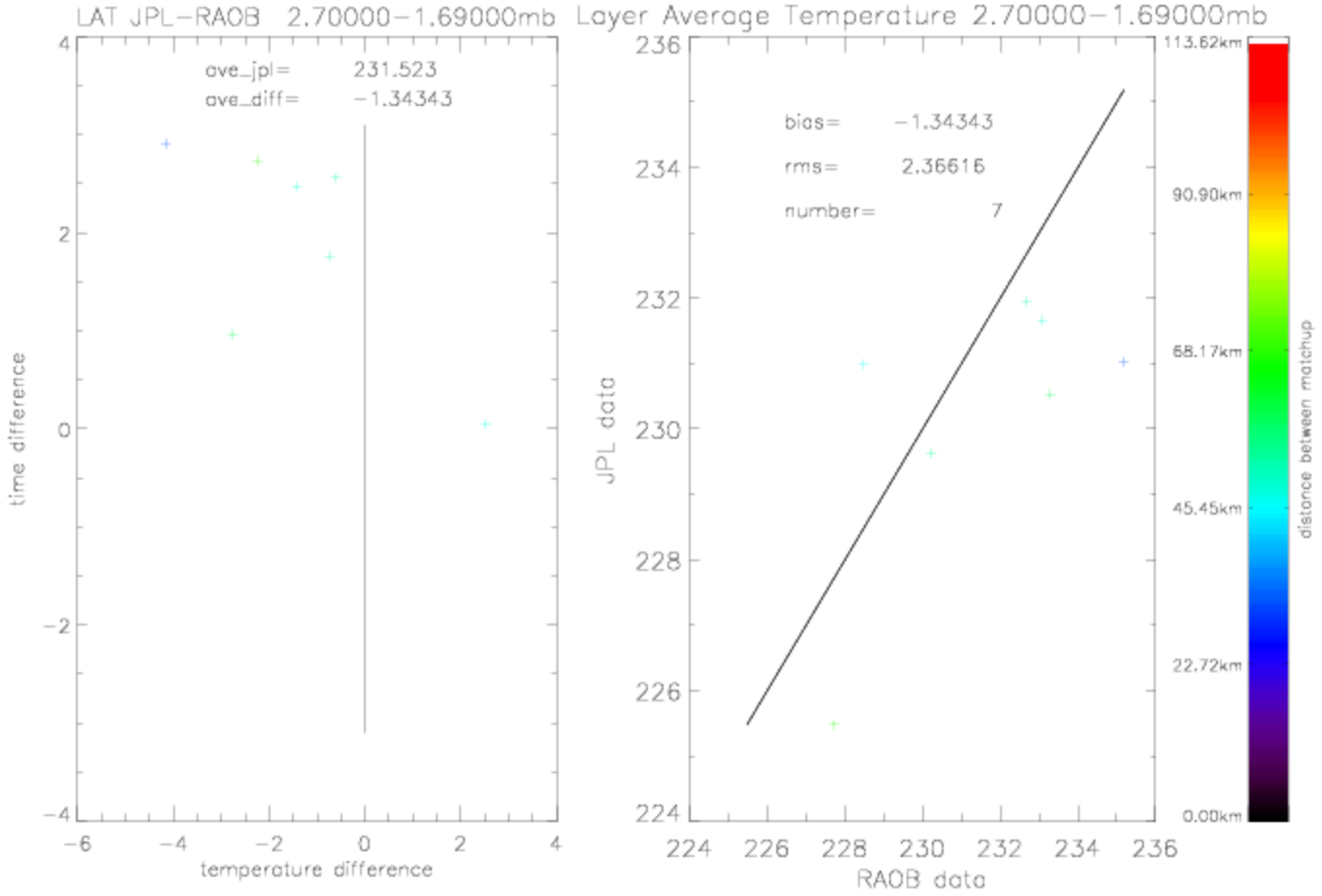

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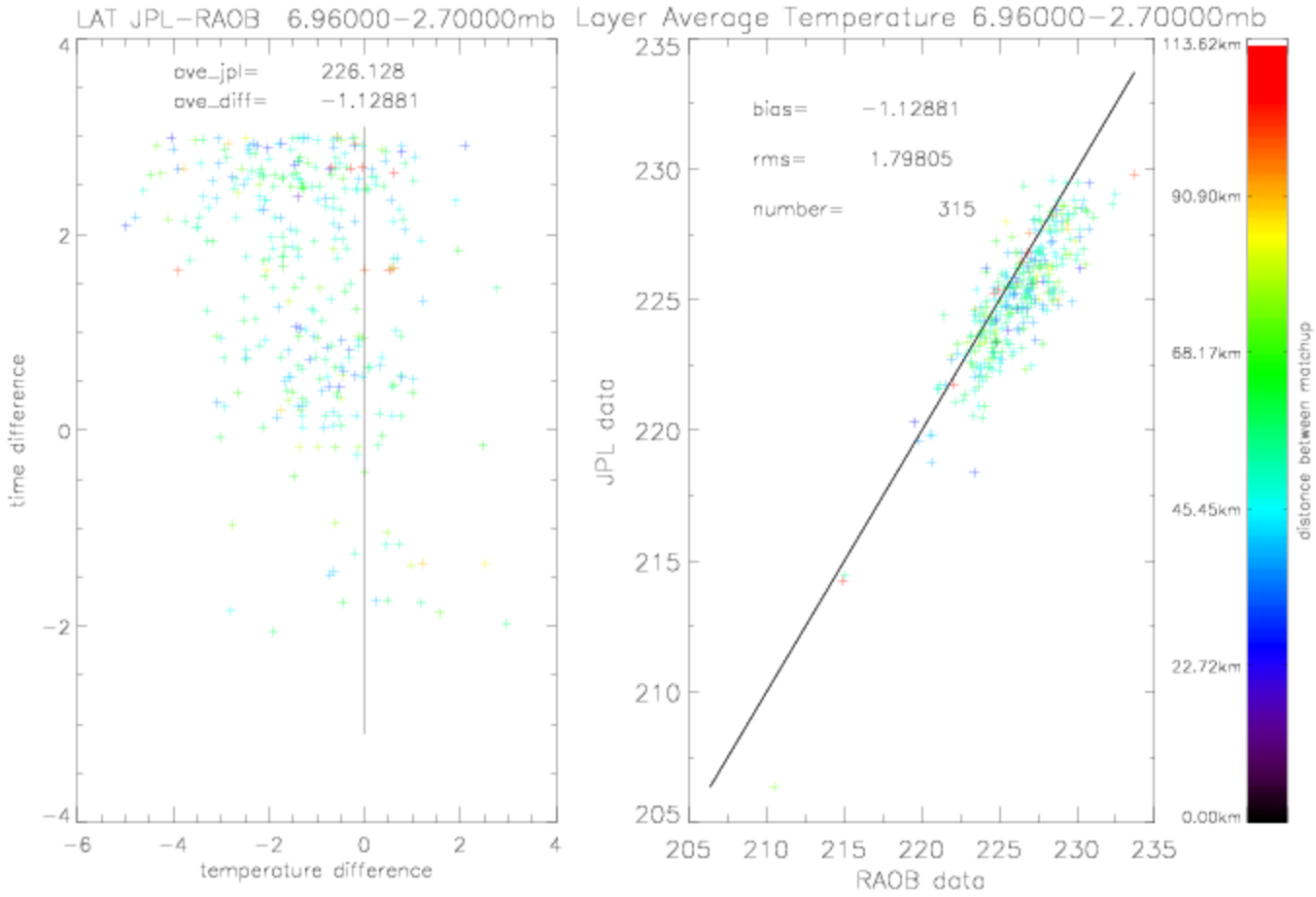

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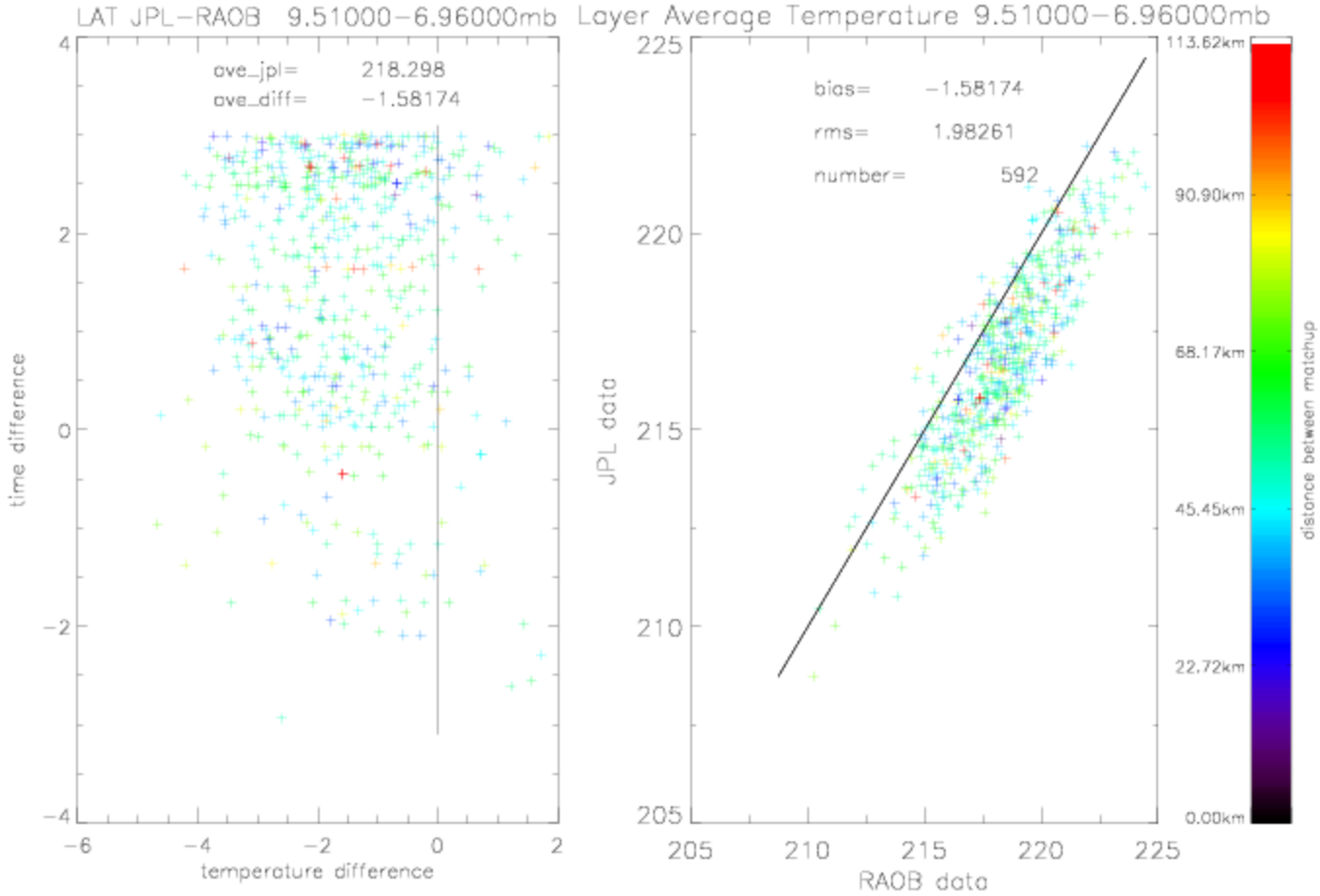

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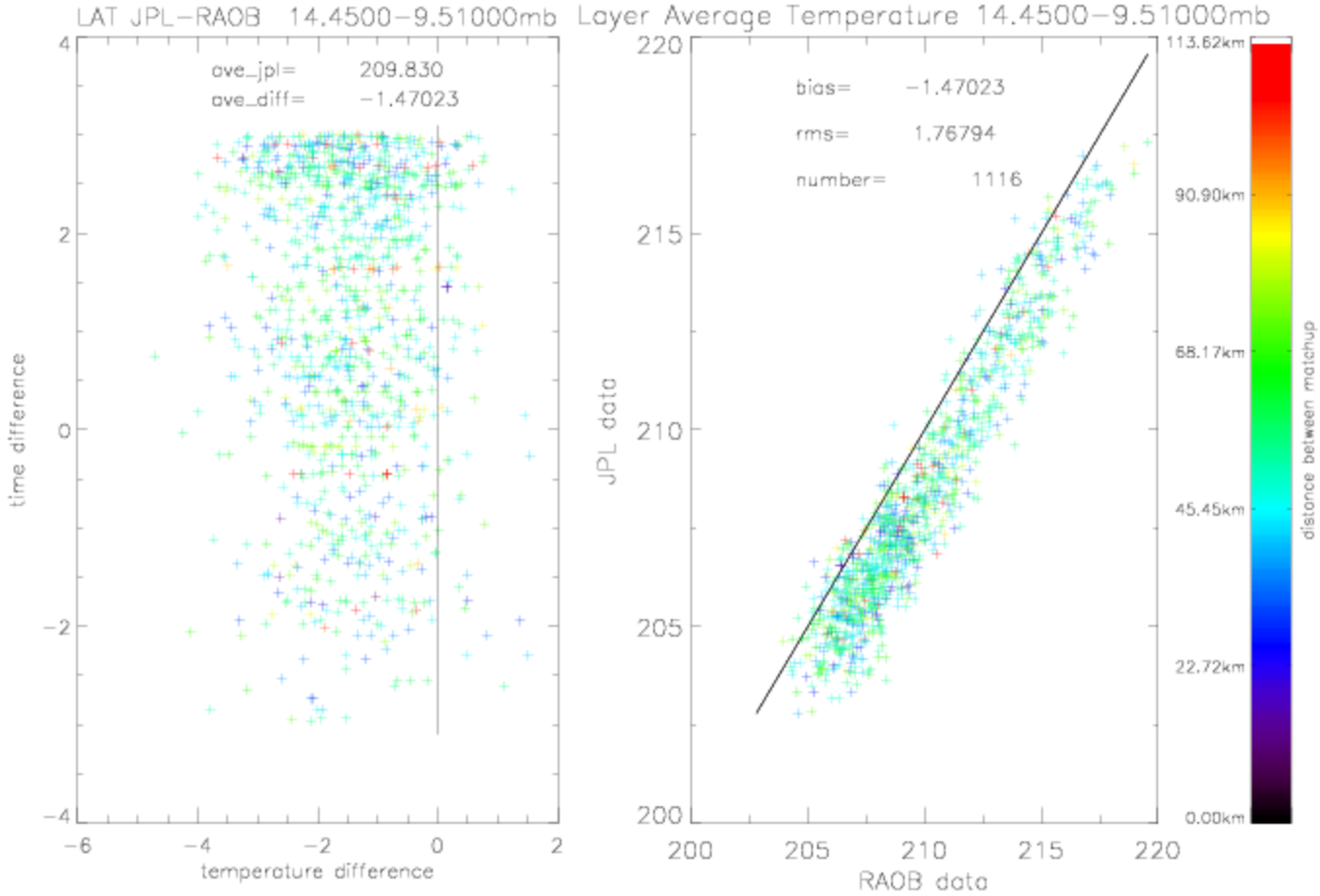

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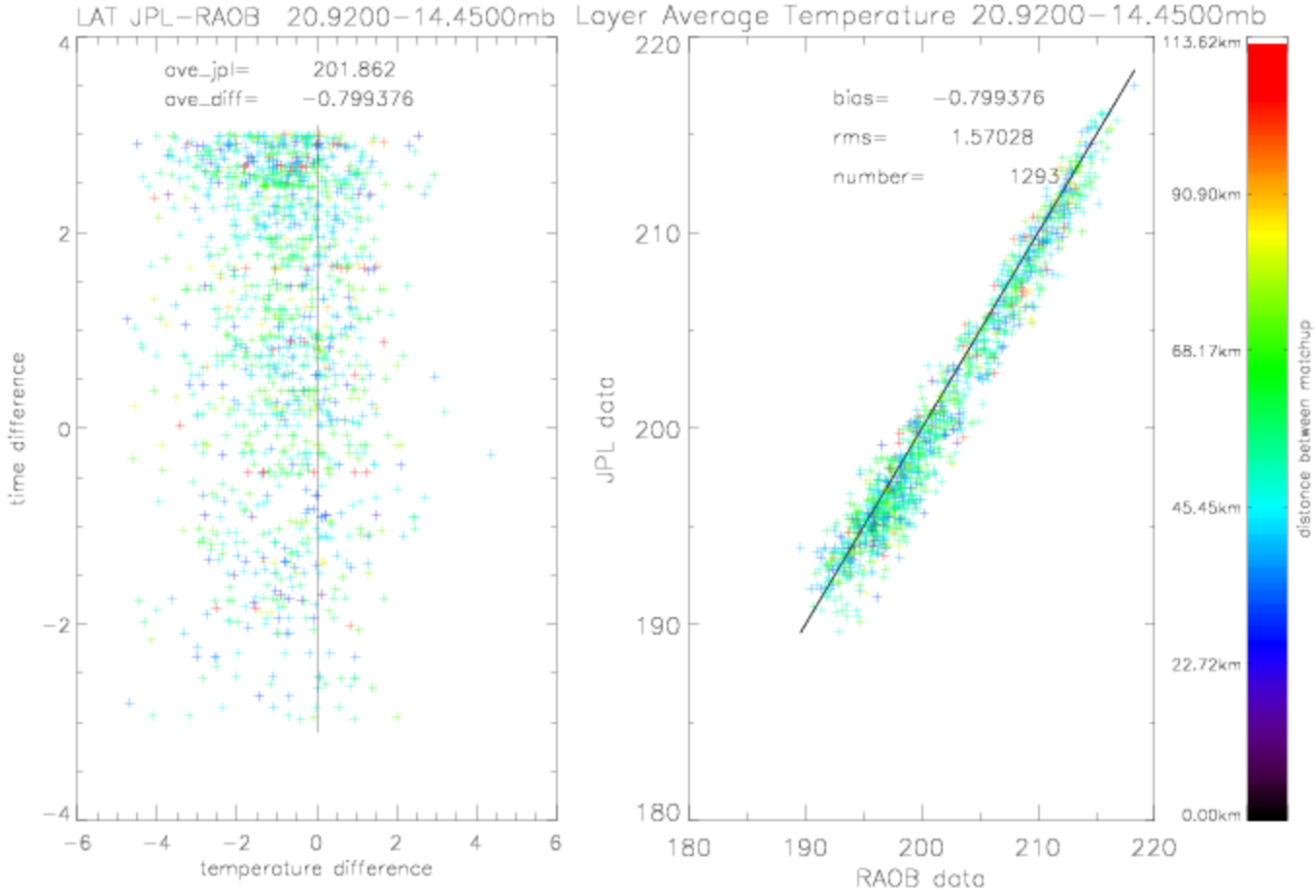

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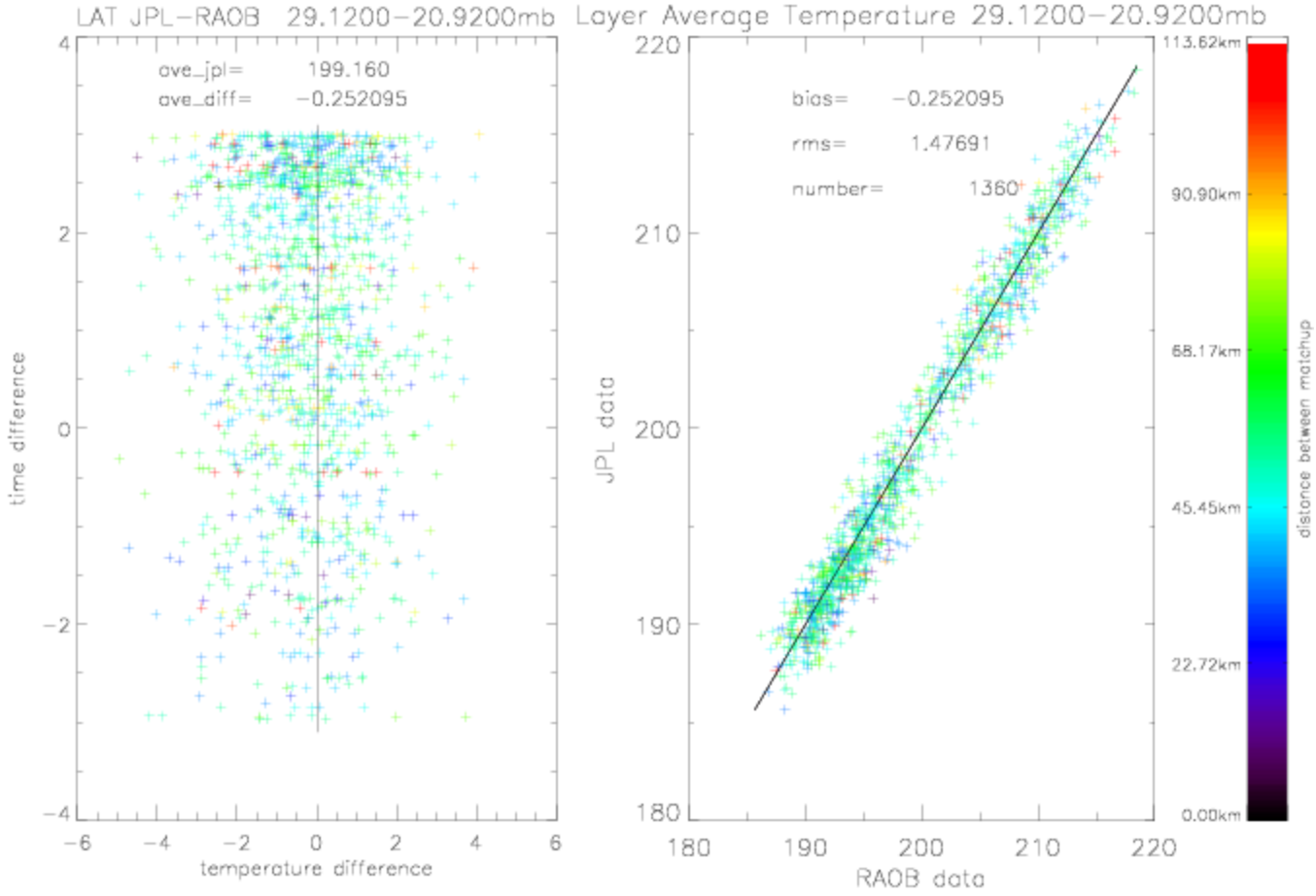

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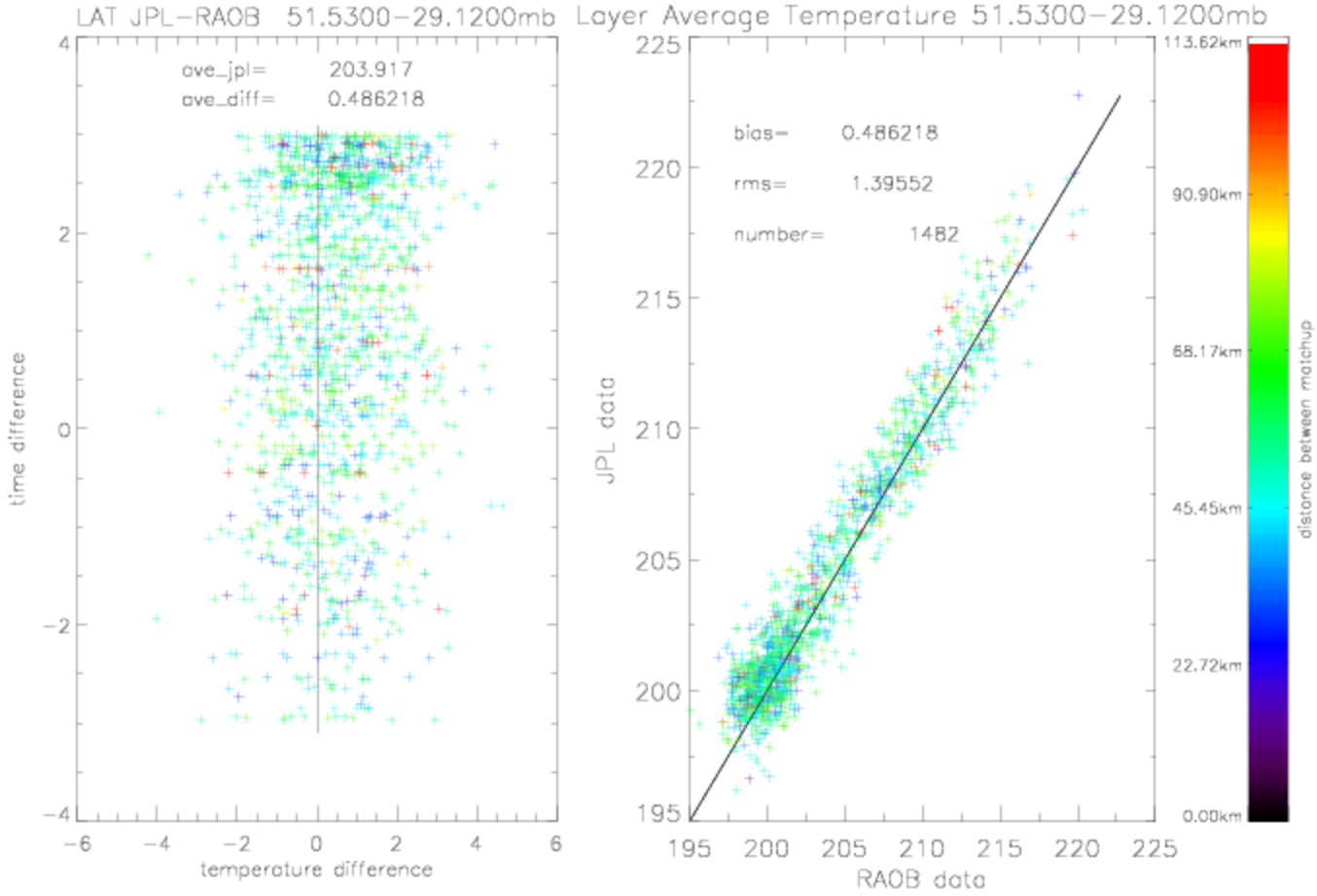

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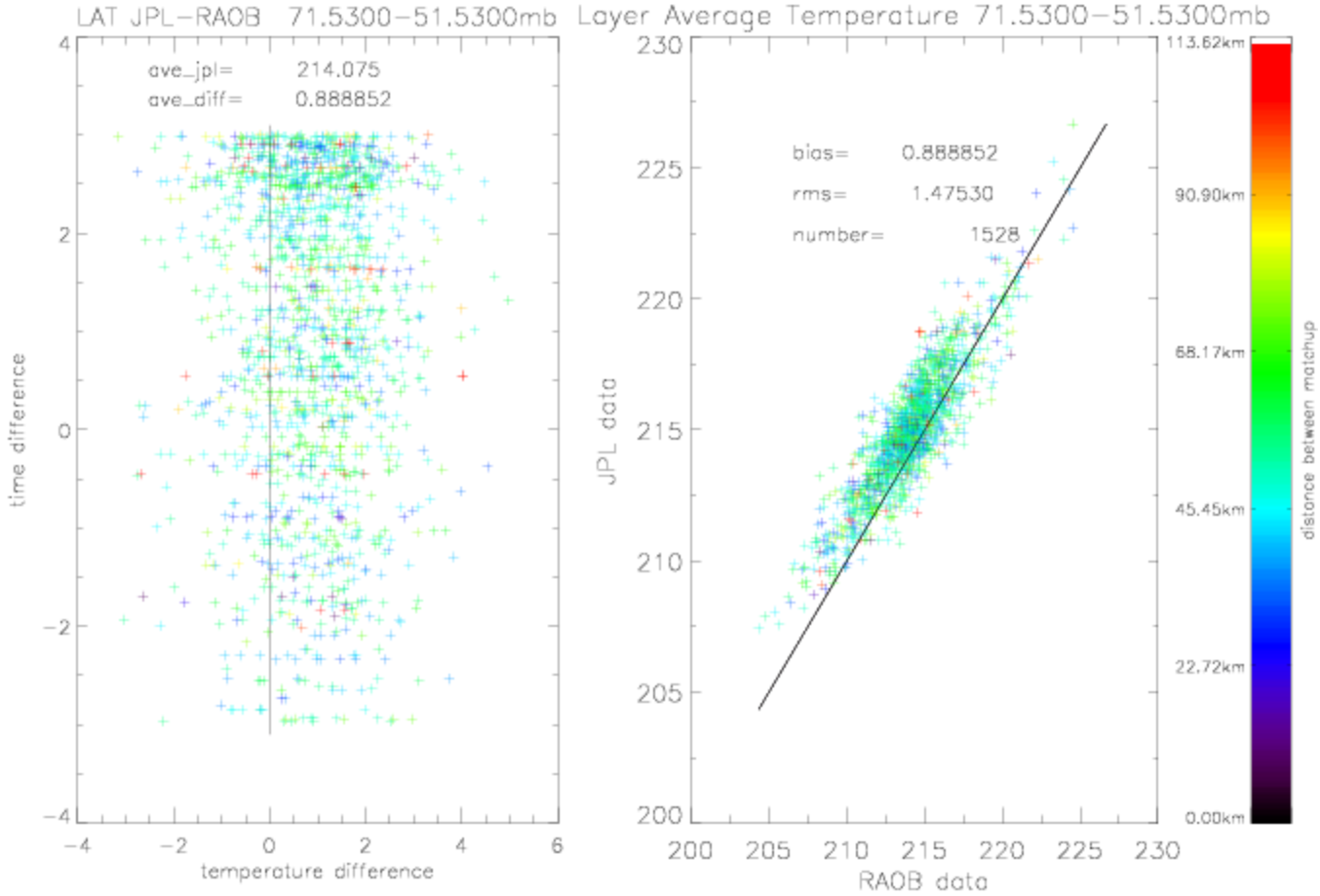

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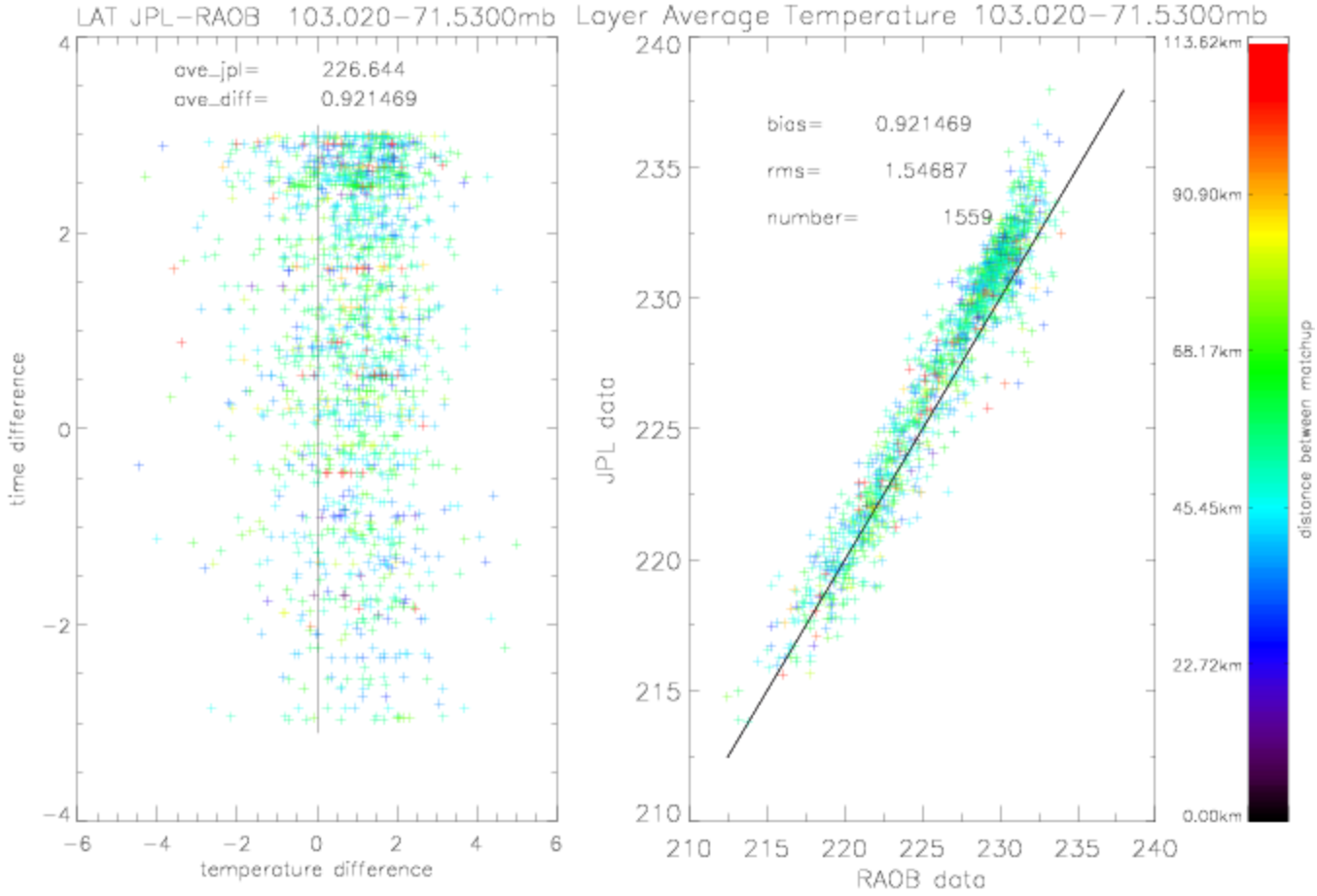

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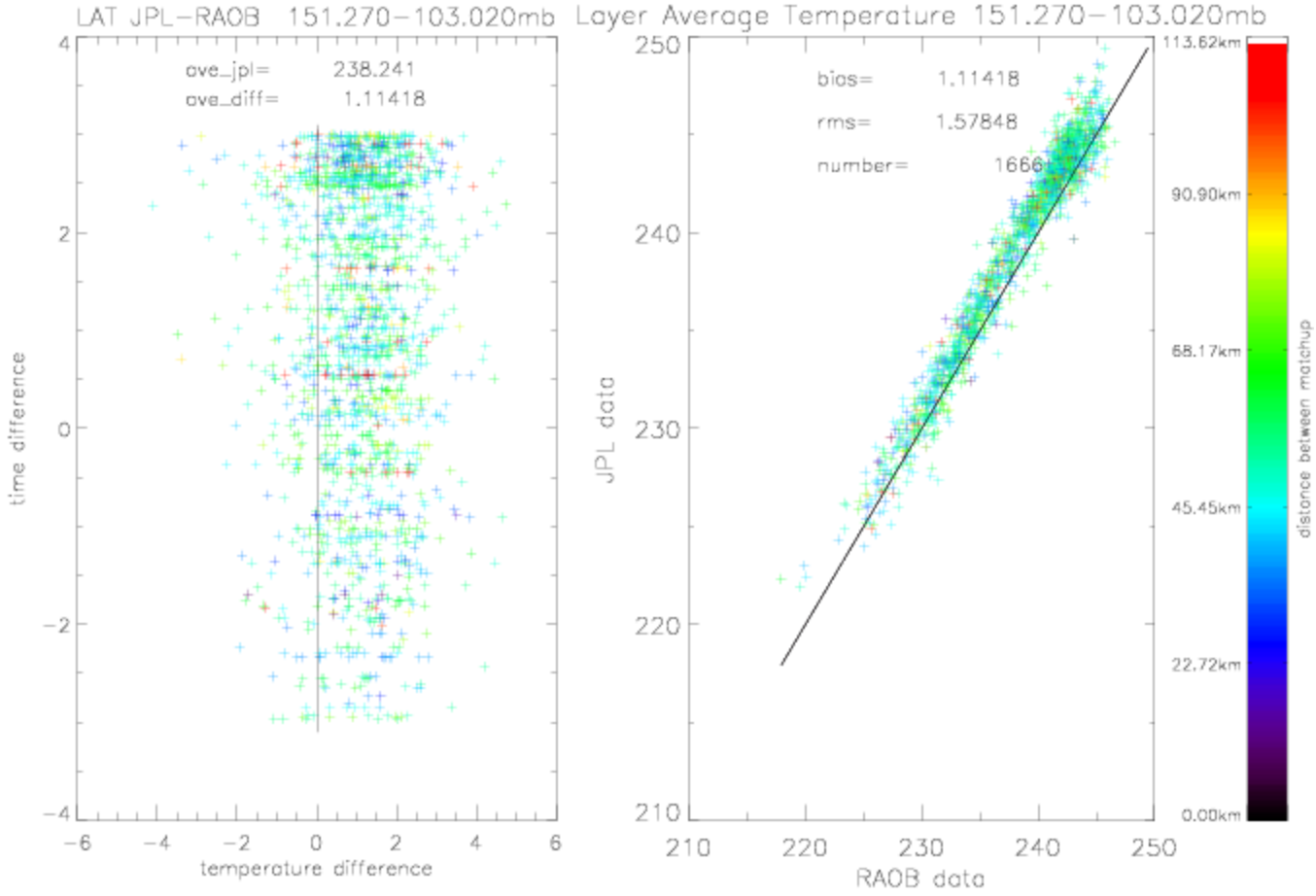

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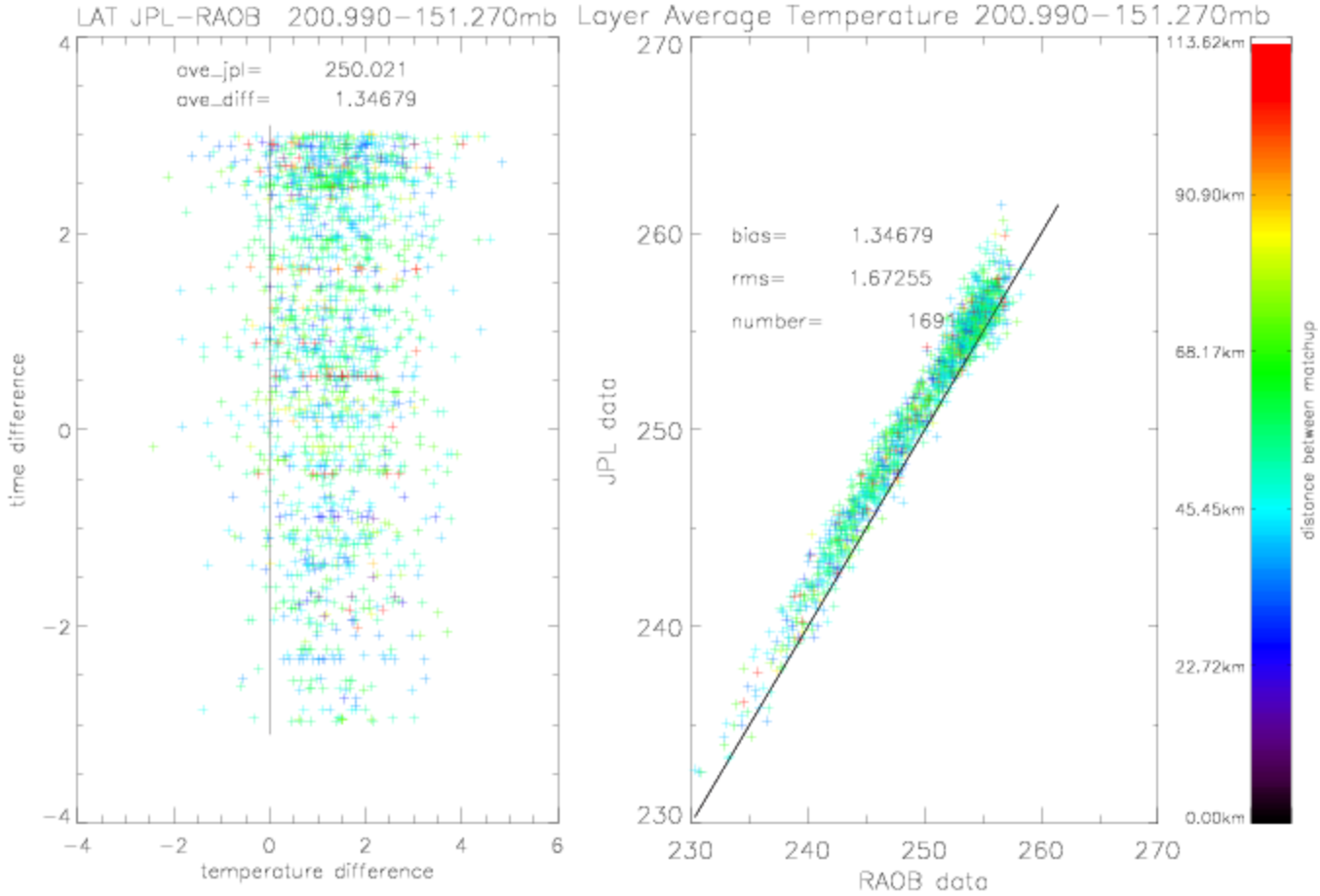

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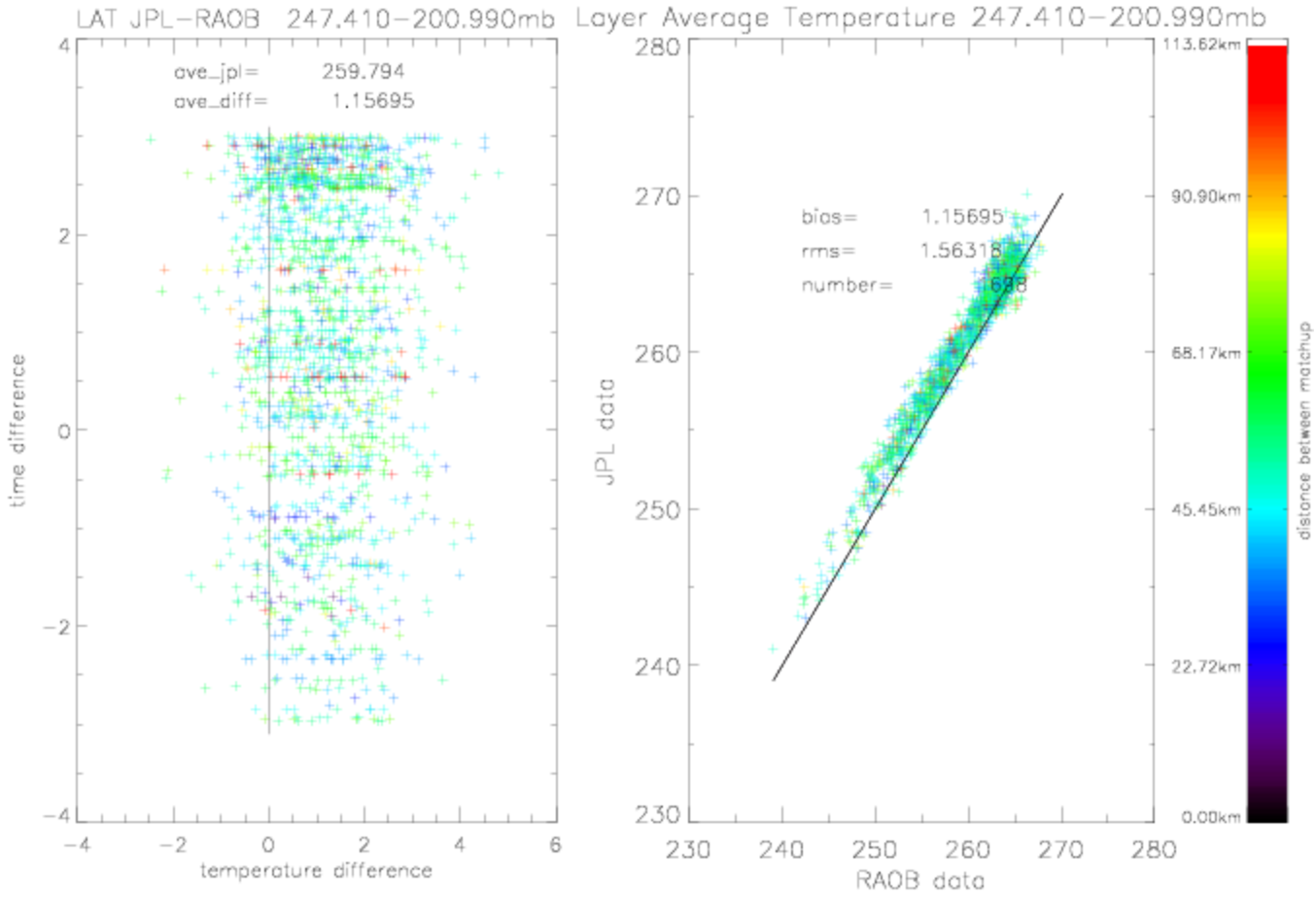

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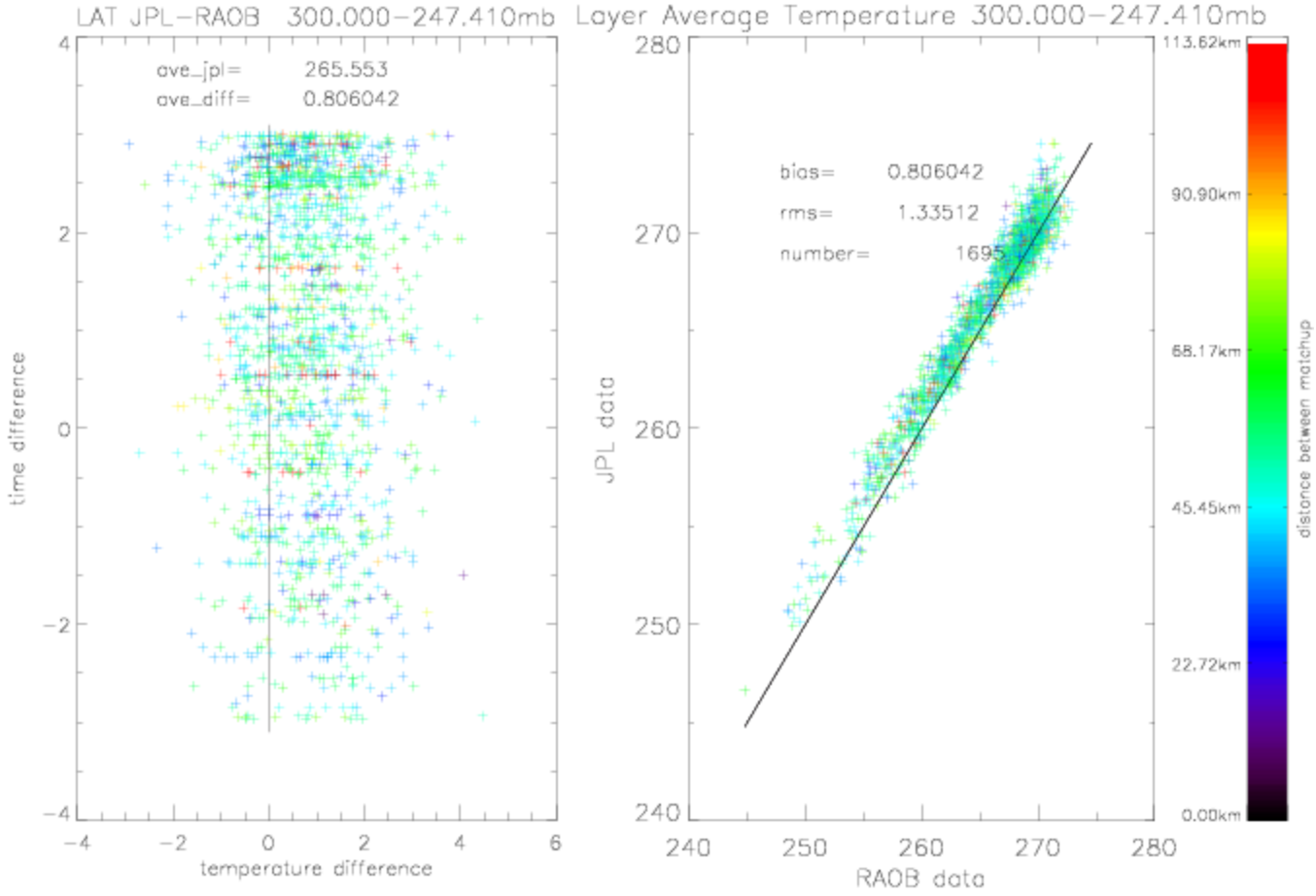

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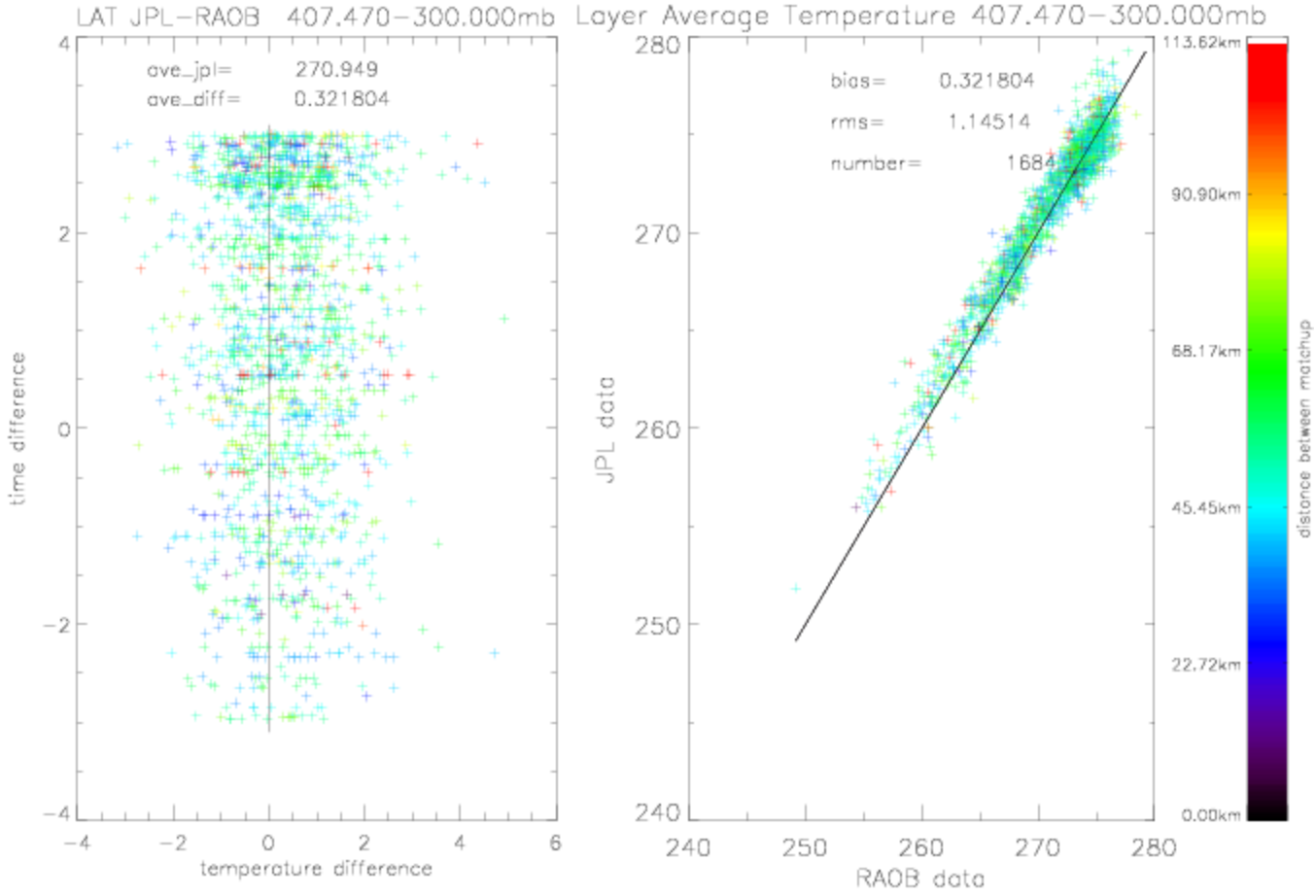

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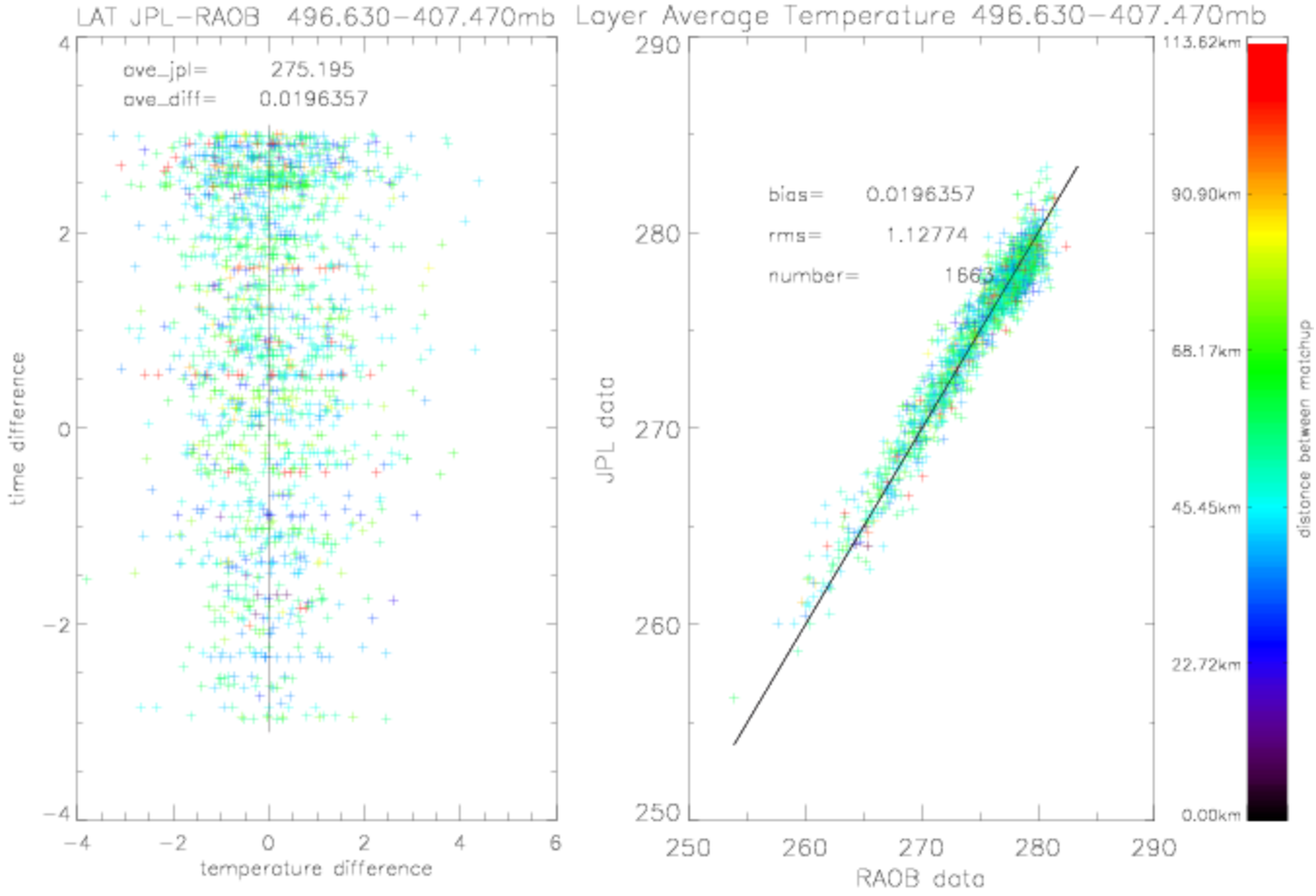

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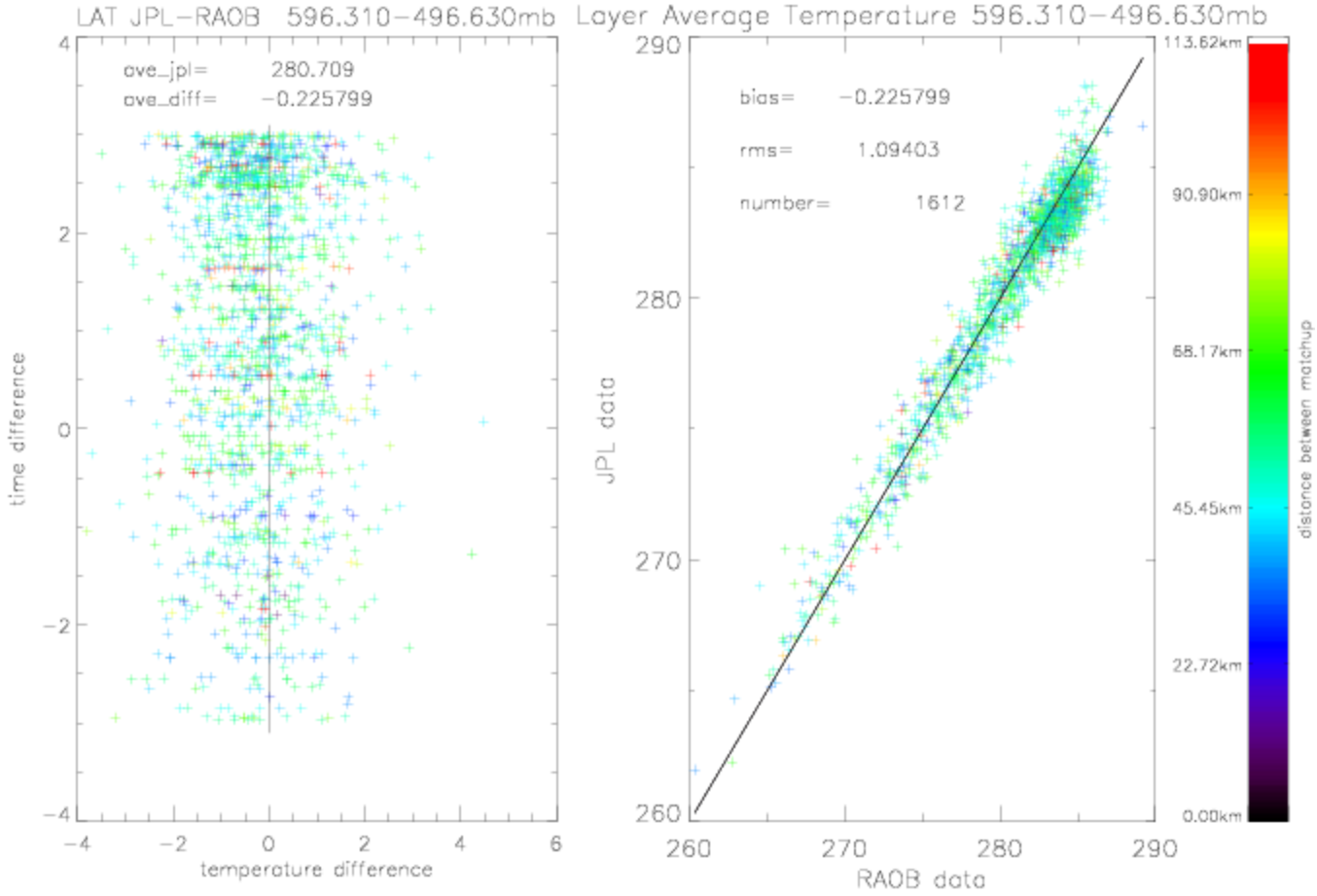

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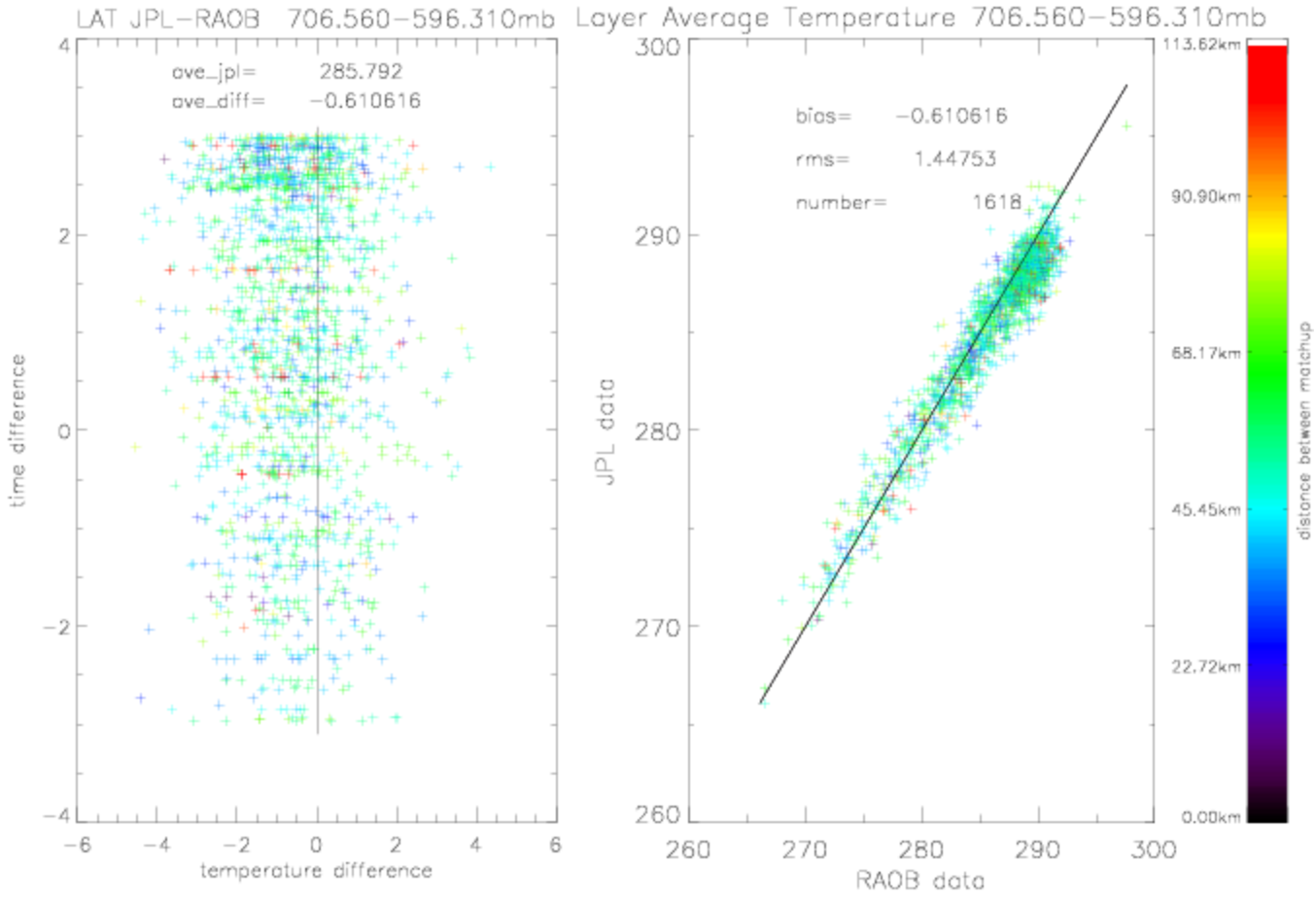

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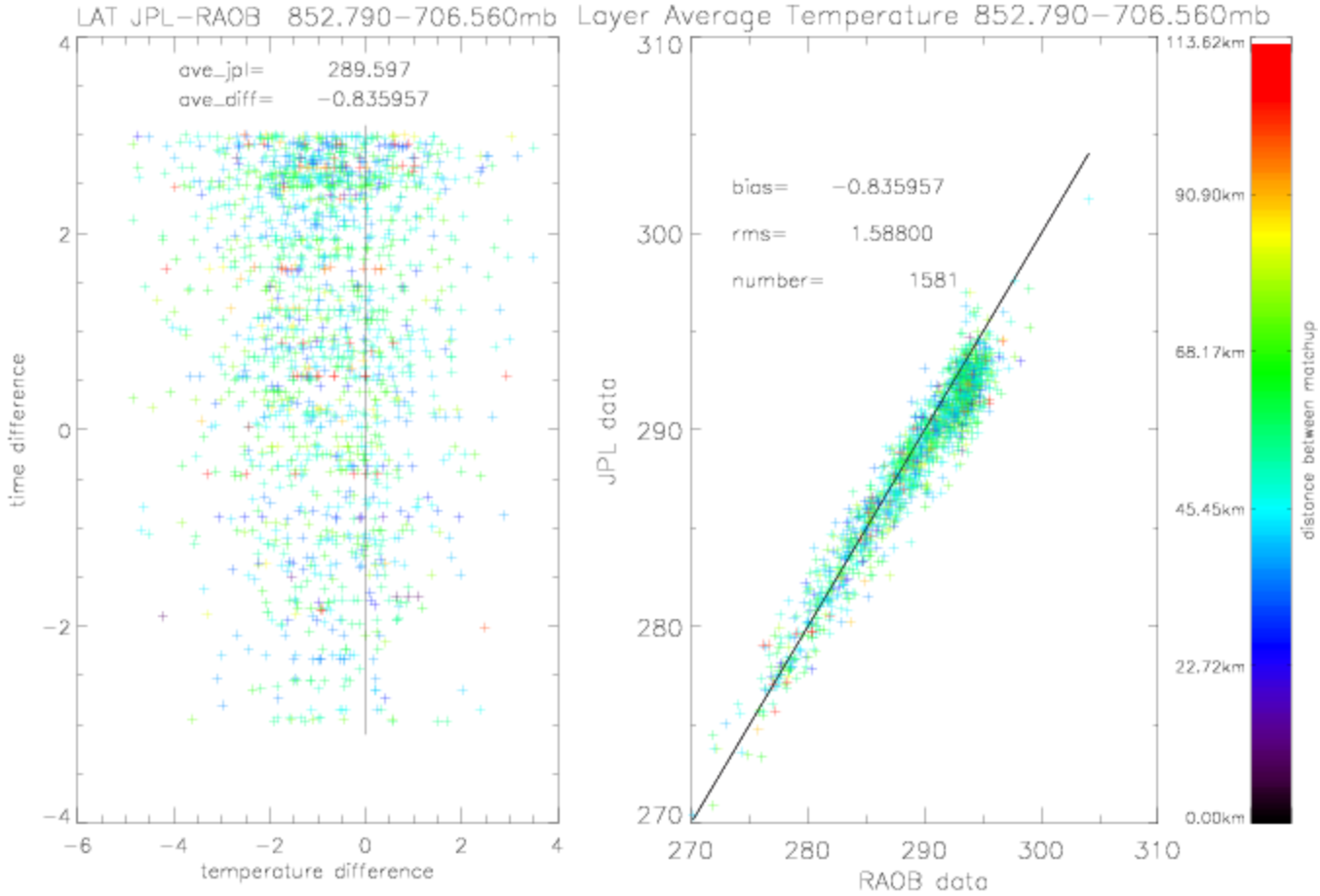

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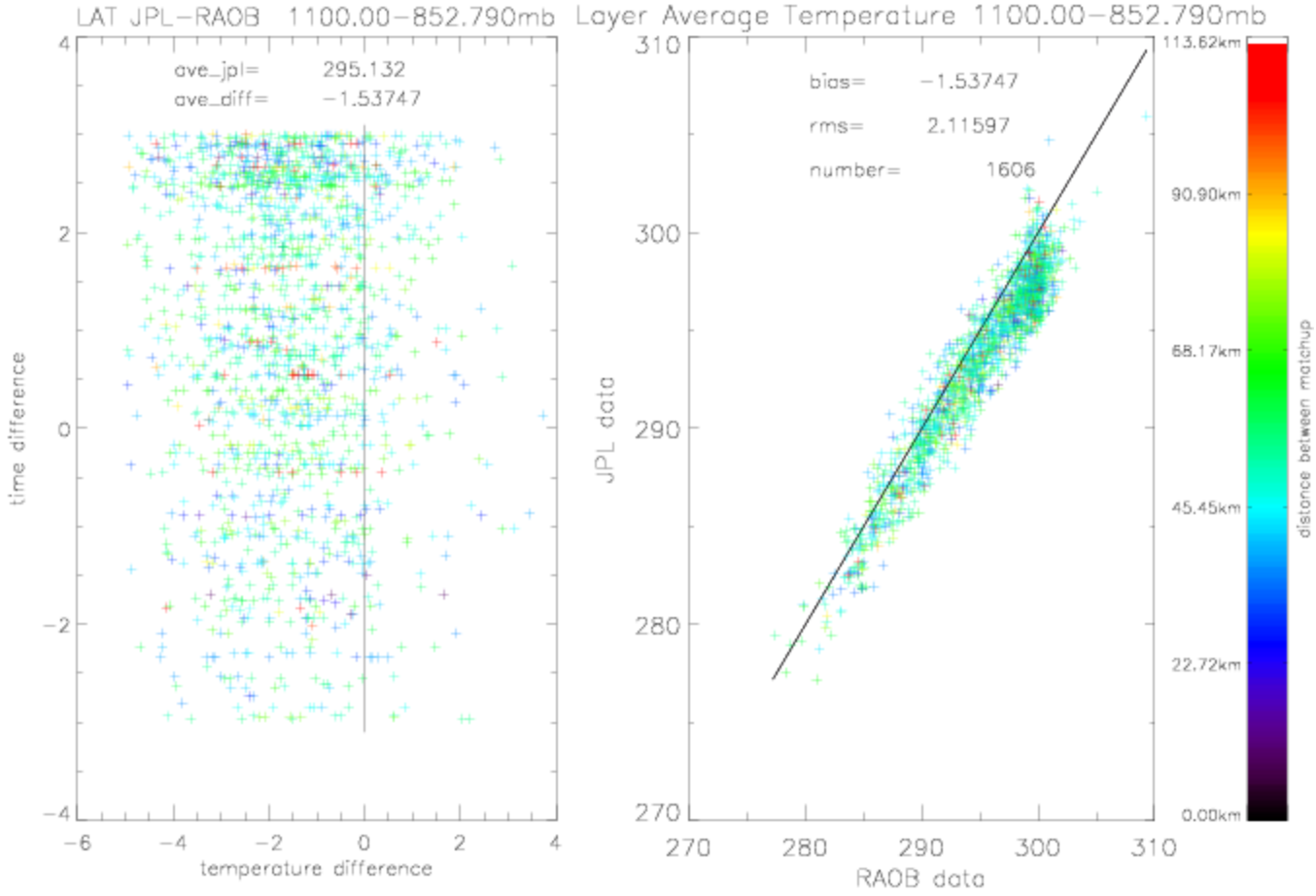

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